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## INDICATIONS FOR OPEN HEART SURGERY USING TEMPORARY CARDIOPULMONARY BYPASS * †


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During the past two and one-half years 465 patients were operated upon using a pump oxygenator which permitted open cardiotomy during temporary cardiopulmonary bypass (Table 1). Among these patients 392 had congenital and 73 acquired lesions. From this experience certain conclusions may be made regarding the present status of open heart surgery based upon operative risk and late follow-up results. Although current opinions are subject to change as experience increases, indications for operation must be determined mostly by the results already obtained. Anticipated results for various lesions may thus be categorized as good, fair, and poor.

TABLE 1
LESIONS OPERATED UPON DURING TEMPORARY CARDIOPULMONARY BYPASS

| | | |
|---|---|---|
| Congenital | | |
| Ventricular Septal Defect | | 164 |
| Atrial Septal Defect | | 123 |
| Ostium Secundum | (90) | |
| Ostium Primum | (20) | |
| A-V Communis | (13) | |
| Tetralogy of Fallot | | 29 |
| Aortic and Subaortic Stenosis | | 20 |
| Pulmonic and Infundibular Stenosis | | 22 |
| Total Anomaly Pulmonary Venous Drainage | | 10 |
| Transposition of Great Vessels | | 6 |
| Miscellaneous Congenital | | 15 |
| Aortico-pulmonary Septal Defect | | 3 |
| | | 392 |
| Acquired | | |
| Calcific Aortic Stenosis | | 24 |
| Aneurysm Ascending Aorta | | 14 |
| Mitral Stenosis | | 10 |
| Mitral Insufficiency | | 6 |
| Aortic Insufficiency | | 4 |
| Myocardial Infarction | | 5 |
| Aneurysm Left Ventricle | (4) | |
| Ventricular Septal Defect | (1) | |
| Sinus Valsalva Fistula | | 4 |
| Myxoma | | 3 |
| Left Atrium | (2) | |
| Right Atrium | (1) | |
| Traumatic | | 3 |
| Aortic Ventricular Stab Wound | (2) | |
| Ruptured Papillary Muscle | (1) | |
| | | 73 |
| TOTAL | | 465 |

### GOOD RESULTS

*Ventricular Septal Defects:* This lesion was the commonest indication for open heart surgery in this series. Among 164 patients an over-all mortality of 18 per cent occurred. A number of factors determined survival in these patients but the most important were the age of the


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patient and severity of pulmonary vascular changes. Thus, in patients less than 2 years of age there was an operative mortality of 40 per cent. In spite of the apparently prohibitive mortality in infants, operation is frequently justified as a salvage procedure and the fact that it was successful in 60 per cent of cases makes operation justifiable in critical cases. For 100 patients between the ages of 2 and 15 years there were 7 deaths or a mortality of 7 per cent. Patients with severe pulmonary hypertension were operated upon but the presence of frank cyanosis and polycythemia were considered contraindications. In this type lesion known as Eisenmenger's complex the presence of severe right to left shunt precludes surgical correction at the present time.

Since no deaths occurred in patients with normal or moderately elevated pulmonary arterial pressure, almost all ventricular septal defects should be repaired. The presence of increased pulmonary vascular resistance is not necessary in selection of patients.

*Atrial Septal Defects:* Ostium Secundum Type. This is the commonest type of atrial septal defect and was the indication for operation in 90 patients. All 6 deaths in this series were in patients more than 25 years old and usually with findings of advanced cardiopulmonary disease. Selection of patients of this age must be done carefully, but the majority of patients less than 25 years old should be operated upon if a significant left to right intracardiac shunt is present.

Ostium Primum Type: Twenty patients with ostium primum defects were operated upon with 3 deaths. In this lesion which occurs low in the septum in close proximity to the mitral and tricuspid valves conduction disturbance may occur after operation in the form of A-V dissociation or complete heart block. This complication may detract from the result expected from complete anatomic repair of the defect. Nevertheless operation in this group of patients is usually well tolerated and the long term results are gratifying.

*Tetralogy of Fallot:* Two types of tetralogy of Fallot were recognized with almost similar anatomic findings — one, the cyanotic type, and the other, the acyanotic type. The presence of cyanosis depends upon the degree of pulmonary stenosis and overriding of the dextroposed aorta. In the acyanotic or minimally cyanosed patient with tetralogy of Fallot results are comparable to results in isolated ventricular septal defect. With patients exhibiting severe cyanosis and diminutive pulmonary artery the ultimate result of operation may be striking but the immediate operative mortality was approximately 40 per cent. In very small infants in critical condition from cyanotic spells the anastomotic procedures of Blalock and Potts offer good palliative relief.

*Aortic and Subaortic Stenosis, Congenital:* Risk of operation in this lesion is low as evidenced by a series of 20 consecutive patients without a postoperative death. Occasional mild aortic regurgitation follows valvulotomy, but in general the left ventricular strain is relieved by surgical treatment. The youngest patient was 4 weeks of age and an excellent result was obtained.

*Pulmonic Valvular and Infundibular Stenosis:* Excellent results are obtained with open heart surgery for these lesions. For infundibular stenosis resection of the obstructing portion of the outflow tract is often sufficient to remove the gradient between ventricular cavity and pulmonary artery. In some instances enlargement of the outflow tract was achieved with a patch of compressed polyvinyl sponge sutured into the outflow tract as a "gore." Most cases of isolated valvular stenosis may be treated by closed technics of valvulotomy, but if the result is unsatisfactory, then open surgery is indicated. Among the 22 patients operated upon for pulmonic stenosis there was one death.

*Total Anomalous Pulmonary Venous Drainage:* This lesion, although rare, is being recognized with increasing frequency.

A total of 10 patients have been operated upon with this anomaly with 7 successful cases and 3 deaths in extremely critical patients with complicating features making any form of surgical attack extremely risky. Results of complete correction of this anomaly are highly satisfactory.

*Aortico-Pulmonary Septal Defect:* This relatively rare defect was encountered in 3 patients with complete repair by division and suture during cardiopulmonary bypass. All 3 patients survived operation without complication. Previous to open cardiac technics treatment of this lesion by closed technics carried a high operative risk, but correction may now be accomplished with excellent results.

*Aortic Valvular Stenosis, Calcific:* Although the pathologic nature of calcific aortic stenosis prevents precise restoration of valvular function, the results of operation in 24 patients with this lesion have been encouraging. Reduction of the gradient across the aortic valve relieves left ventricular strain with remarkable improvement in cardiac function in most instances. The operation is indicated in patients with aortic stenosis producing angina, recurrent syncope, or pulmonary edema.

*Mitral Stenosis:* An excellent view of the mitral valve may be obtained by a right sided approach opening the left atrium inside of the pericardium. Division of the commissures under direct vision permits accurate repair of the mitral stenosis and control of thrombi and embolism from the left atrium. This technic was used in 10 patients all of whom had previous closed commissurotomy. The procedure which at present is reserved only for the recurrent lesions may subseqently be used for primary operations.

*Ventricular Aneurysm:* All 4 patients submitted to operation for ventricular aneurysm following myocardial infarction survived operation with a good functional result. Complete excision of the aneurysm with ventriculoplasty was demonstrated to improve cardiac output by cardiac catheterization after operation. Operation may be performed within the first few months after infarction.

*Sinus of Valsalva Fistula:* This relatively rare condition may be completely corrected by right ventriculotomy and suture of the ventricular opening of the sinus fistula. All 4 patients survived operation with satisfactory results although 2 had controlled aortic regurgitation after operation.

*Cardiac Myxoma:* Although the clinical diagnosis of this lesion was difficult, surgical treatment was successful in 3 cases. In 2 cases of left atrial myxoma the diagnosis was established at surgical exploration for possible mitral stenosis. Right atrial myxoma was diagnosed in one patient after cardiac catheterization. No recurrence of these lesions has been noted.

*Traumatic Lesions:* Stab wounds or blunt injury may produce acquired septal defects or ruptured valves which require surgical treatment. Results are usually excellent with restoration of normal cardiac function.

### FAIR RESULTS

*Atrio-Ventricularis Communis:* This complicated anomaly involves not only the atrial and ventricular septa but also is associated with clefts and extensive maldevelopments of the tricuspid and mitral valves. Often the lesion accompanies other congenital anomalies including Mongolism. In our series of 13 cases 7 deaths occurred, 5 of which were infants less than 2 years of age. In some instances this lesion is virtually incorrectible but in many a satisfactory repair may be obtained using a prosthesis in the septal repair.

*Aortic Insufficiency:* Direct procedures upon the valve itself are designed to repair the valve leaflets or reduce the size of the aortic annulus or both. Direct repair of the regurgitant valve was successful in only one out of four patients. Introduction of suitable valve substitutes may subsequently improve the outlook for these patients.

*Mitral Insufficiency:* Certain types of mitral insufficiency in which the leaflets

are intact and relatively supple are amenable to surgical correction. Reduction in size of the annulus and restoration of valvular competence may be accomplished by sutures placed across the commissures. Success of this procedure depends upon the pathologic condition of the valve which can only be ascertained at cardiotomy. In our cases we encountered severe calcification, ruptured papillary muscles, and severe fibrosis and contraction of leaflets obviating restoration of valve function and accounting for ultimate death of all patients. Nevertheless valvuloplasty under direct vision should provide relief in favorable cases.

POOR RESULTS

*Transposition of Great Vessels:* This complicated anomaly produces high mortality in infants from anoxemia and cardiac failure. Total surgical correction using the pump oxygenator has not been successful. Attempts at transposing either the venous return or the arterial outflow of the heart have led to death of the patient. At present only palliative procedures such as creation of an interatrial defect or transposing the right pulmonary veins and inferior vena cava are justified.

*Miscellaneous Congenital Conditions:* Mitral atresia, single ventricle with rudimentary outflow chamber, tricuspid atresia, truncus arteriosus, Ebstein's disease.

SUMMARY

Development of the pump oxygenator for temporary cardiopulmonary bypass has increased the scope of cardiovascular surgery. Among 465 operations using the pump oxygenator 392 were for congenital and 73 for acquired lesions. As pioneering experience with open heart surgery increases, the efficacy of direct operation in certain types of lesion may only be determined by close scrutiny of the results. Best results may be expected with ventricular septal defect, atrial septal defect, tetralogy of Fallot, aortic stenosis, pulmonary stenosis, anomalous pulmonary venous drainage, mitral stenosis, ventricular aneurysm and several other less common conditions.

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## URETHRAL STRICTURE: CURRENT CONCEPTS IN MANAGEMENT *

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Urethral strictures have been a problem to man, through the ages, being recorded even in the Hindoo writings of 600 B. C. With the outbreak of the first serious epidemic of gonorrhea in 1520 A. D., history records for the first time the serious difficulties encountered in their management. In the nineteenth century, definite improvements were developed: filiforms and followers, the urethrotome for internal urethrotomy. Whereas these things helped, the results still lacked much to be desired. To be sure, the basic treatment has been and is still physical dilatation. To accept this therapy alone and to fail to envision improved methods of management would be stagnation of medical science at its worst. On the other hand, has progress been made in the past decade? To answer this "posed" question has stimulated the following report.

The term *stricture*, herein, is defined as an abnormal narrowing of a canal, duct, or passage, either from cicatricial contraction or the deposit of abnormal tissue. In the urethra, it can occur singly and in multiple, from the external urethral orifice to and inclusive of the internal urethral orifice (bladder neck). It can be congenital or acquired. If congenital, it is smooth, and concentric; whereas the opening in the acquired stricture is often

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ragged, eccentric and tortuous. All strictures of the urethra show proliferation of fibroblasts in the tunica propria, the layer of tissue just beneath the urethral mucosa. If the lesion progresses, fibroblasts replace the elastic tissue and smooth muscle of the tunica propria, and in extreme cases fibroblastic tissue may also replace the corpus spongiosum and the urethral mucosa.[1]

### CONGENITAL STRICTURE

The congenital stricture is notably situated at the meatus, penoscrotal junction, and bladder neck. The commonly accepted practice today, of circumcision in the newborn male should be accompanied by careful inspection with simultaneous correction of the small meatus. Categorically, the small meatus is frequently present in the female though not as frequent as in the male. Within the past year, two young female children have been seen in urinary retention with no other explanation than a meatal stricture. Contracture of the vesical neck is essentially a congenital abnormality yet may also result from the fibrosis secondary to chronic infection. This one facet of obstructive uropathy alone is so common and so important that it ranks first, today, in the urological subjects of congenital origin that are publicized or discussed. It is worth while to mention, at this point, the development of the Bradford Young operation in 1953.[2] Here the obstructive tissue is resected and the vesical outlet is enlarged by the interposition of a flap of bladder musculature. This has proved to be one of the most valuable surgical urological procedures yet described. Again it is noted that bladder neck contracture occurs as commonly in the female as in the male.

### ACQUIRED STRICTURE

The acquired stricture is the result of infection or of trauma. Those due to inflammation are located in the penile urethra or in the bulbous urethra, near the membranoprostatic junction. Those secondary to trauma develop at any place in the urethra where injury has occurred. True, gonorrheal strictures are on the way out. It must be remembered, however, that no less than 66 per cent of strictures take fifteen or more years to develop,[3] so that the decrease in future gonorrheal strictures will be somewhat offset by a rise in the incidence from nonspecific urethritis, particularly the many difficult cases seen in World War II and in the Korean conflict. In addition, there will be a greater number of traumatic strictures subsequent to more frequent instrumentation.

### DIAGNOSIS

Progressive diminution of the urinary stream, a forked stream, and the postурination dribbling of urine are typical symptoms. History of gonorrhea treated prior to sulfonamide or antibiotic therapy and the history of a straddle injury to the perineum are significant. The recurrence or persistence of pyuria mandate the elimination of a stricture as the causative factor. Once suspected, proper investigation can be planned with minimal complications. Whereas the emergency presented by acute urinary retention, urinary extravasation, or periurethral abscess remains a troublesome situation.

### MANAGEMENT

A critical review of the literature and of personal experiences has established the fact that much progress has been made in the over-all management of urethral stricture:

1. *Prophylaxis.* More adequate treatment of urethral infection with newer drugs has prevented stricture formation. Medication prior to and following instrumentation has lessened reactions.

2. *Improved analgesia.* There has been the development of safer agents for office use, notably amethone, pyribenzamine and trilene. Ease of instrumentation will bring the patient back; excessive trauma creates failure to return with the serious complications an eventuality.

3. *Improved diagnostic studies.* Urethrograms are most helpful in the complete evaluation of the stricture problem and are easily obtained by injecting water soluble radiopaque media into the urethra. Tixokon is safe and makes excellent urethrograms.[4]

Calibration of the urethra can only be done accurately with Otis bulbs. This creates a "wash board sensation" as the bulb is withdrawn. Emmett (1953) has found good use for this in applying the urethotome to the tight urethra (26 F) before doing a transurethral resection of the prostate. He thereby reduced the incidence of postoperative strictures to 1 per cent [5] as compared to 12 per cent reported in other series.[6]

Excretory urograms are also indicated for full evaluation of the difficult stricture. Over one-third show evidence of upper tract disease, but less than 15 percent of these have symptoms.

4. *Improved instruments.* Filiforms remain the safest means of dilatation. They are now made better, stronger, and more diversified. The woven silk (Phillips) follower has reduced the pain of dilatation considerably and is ideal for the tortuous urethra secondary to tear in the fracture-dislocation of the pubis.

The Council catheter guide has been developed and is ideal for introducing a catheter behind a filiform, minimizing the distinct danger of a catheter guide.

Sounds for infants have been developed with a curve more comparable to the normal anatomy of this age.

5. *Improved operations for complicated cases.* Difficult strictures associated with tortuous or false passages, dense scar tissue, and draining perineal fistulae have presented a real problem over the years. Treatment has been repeated, frequent dilatations after internal or external urethrotomy, and at best has been inadequate. There were no significant improved innovations aimed at "curing" troublesome strictures until the recent past. The following procedures have definitely decreased the frequency for subsequent instrumentation and are indeed worthy of your consideration :

(a). *Resection of urethra with re-anastomosis (Lich, 1951* [8]*).* This is ideal for a stricture less than one and one half inches in length, located in the pendulous urethra. Actually this procedure was tried and discarded at the turn of the century because of infection. Today antibiotics eliminate this cause of failure.

(b). *Transurethral excision of strictures with the small resectoscope (Angle, (1952* [9]*).* This has application in a few select cases where false passages can be converted into a common channel. It is highly technical.

(c). *Eradication of stricture by conversion to hypospadias with subsequent repair (Johansen-Dennis Browne, 1953* [10]*), (Cecil, 1956* [11]*).* This is applicable along the entire anterior urethra except the bulbomembranous position. It is ideal in the "water pot" perineum due to multiple fistulae.

(d). *Transurethral injection of cortisone into stricture (Lyons 1955* [12]*).* The scar tissue is softened, facilitating more effective and less frequent dilatations. This is particularly useful in the stricture located at the bulbomembranous area where open surgery would endanger the external urethral sphincter. The fibrotic external meatus also lends itself readily to injection.

### CASE REPORTS

*Case No. 1*—J. C. M., forty-eight year old white male, first seen in 1952, with history of urethral stricture of many years duration, approximately twenty. He had had repeated urethral dilatations every ten days to two weeks. Ten years ago the patient developed a false passage making instrumentation difficult. He had been treated by numerous urologists over the country. His problem was that of stricture plus bladder neck obstruction. This was managed by transurethral resection of the false passage and bladder neck. Patient is now able to go as long as four to five months between dilatations.

*Case No. 2*—R. W., seventy-three year old colored male, first seen in 1954, in acute urinary retention due to dense urethral stricture. Suprapubic cystotomy was necessary. Perineal urethrotomy with incision of the stricture under vision was done two weeks later. He was then managed by periodic dilatations with filiforms and followers for the next two years, then he did not return for ten months, at which time it was impossible to get a filiform through the urethra. A difficult perineal urethrotomy was done as well as transurethral resection of a progressive bladder neck obstruction. The patient then developed a marked re-stricture of the urethra. This was now managed by resection of the strictured area with primary anastomosis of the severed ends. Patient

now has negative urine and is dilated with ease through a 26 French.

*Case No. 3*—W. B., thirty-seven year old colored male, was first seen in 1952, with periurethral abscess secondary to urethral stricture. He was dilated with filiforms and followers periodically for the next two years. He did not return for two years, at which time it was impossible to get any instrument through the urethra. KUB showed multiple stones in the right kidney and excretory urograms revealed bilateral, chronic pyelonephritis with hydronephrosis. He also had multiple draining perineal fistulae, the so called "water-pot" perineum. A first stage Johansen-Dennis Browne procedure was done as well as instituting drainage by suprapubic cystotomy. This patient's general condition improved as well as the functional and anatomical appearance of the upper urinary tract. Five months later a second stage Johansen-Dennis Browne procedure was done.


## SUMMARY

The mandates in management of urethral strictures have been in the past, and are, today, the same: asepsis, avoidance of excessive pain and trauma, and adequate follow-up. In the patient with acute urinary retention and impassable stricture, it is infinitely better to sedate the patient and either drain his bladder suprapubically by trochar cystotomy or aspiration needle or to send him to someone with more experience, than to ram an instrument recklessly through the urethral obstruction. Under general or spinal anesthesia, it may become possible to traverse the stricture, then to dilate it to the maximum without undue trauma.

Should the patient complain that his urinary stream is only improved for a few days after dilatation of the stricture and should a No. 16 French instrument pass and deliver significant residual urine, there is concomittant bladder neck obstruction necessitating corrective surgery in itself. This can be a pitfall to adequate management if not recognized.

Should difficulty persist in getting small instruments through the urethra and where the interval between dilatations cannot be extended, a corrective type of surgical procedure should be fitted to the particular problem.


## CONCLUSION

Great strides have been made in recent years in the management of urethral strictures. Much needed attention has been directed to the frequency, early detection and adequate treatment of congenital uropathy in the urethra. The dim view of the past "once a stricture, always a stricture" has definitely been modified or changed. Many urological cripples due to complicated urethral strictures can now look to a urinary tract free of infection, free of obstruction and not dependent upon frequent, painful dilatations.

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## DISCUSSION

Dr. Harry Q. Gahagan (Alexandria): I have learned to expect good informative papers from Dr. St. Martin and his Associates. This paper today is no exception and I am sure we have all benefited from it.

My remarks will be confined to strictures associated with severance of the membranous urethra which often occurs with fractures of the pelvis. This injury can result in one of our most difficult strictures if it is improperly handled. Anyone doing accident work will be faced with this problem sooner or later.

An immediate suprapubic cystostomy should be done. By passing one sound through the penile urethra and another transvesically through the prostatic urethra, the severed ends can be aligned and the penile sound can be passed up into the

bladder. The butt end of a plain catheter can be slipped snugly over the tip of this sound and withdrawn through the entire length of the urethra. To this plain catheter a #24F Foley catheter with a 30 cc. bag is tied and pulled through the penile urethra up into the bladder. The bag of this catheter is inflated and gentle traction is maintained on the catheter by means of a rubber band taped to the lower inner thigh. Thereby the catheter not only maintains alignment of the severed ends but the traction also holds the ends in close approximation so healing takes place with minimal scar formation.

Several of my patients handled in this fashion are seen only once or twice yearly and a generous size sound can be passed without difficulty.

## HOME ACCIDENT PROGRAMS *

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An increasing awareness of the importance of accidents as a leading cause of mortality and morbidity has alerted the medical profession into a concerted effort directed at reducing these appalling statistics. The continuing strides in the eradication of infectious diseases, along with the marked improvement in general sanitation has only served to emphasize the proportionate increase in accidental deaths especially in children. Table 1 illustrates strikingly how accidents claim more fatalities than the next five leading causes of death in this age group. Our modern machine-age civilization, growing more complex with each passing year, serves notice that this problem will be with us with increasing importance in the future. However, lest one think that the chief hazards lie in the outside world, evidence is at hand to show that a marked preponderance of these unfortunate occurrences take place in the home (Table 2). The reduction in the shocking total of traffic accidents is being considered by many experts in the field of automotive and highway engineering. The problem of mishaps about the home must justifiably be considered within the realm of medical and public health responsibility.

As with any other medical problem requiring scientific investigation, any reduction in the number of home accidents will require first an evaluation as to etiology, followed by an application of those factors into a rational approach toward their prevention and management. There is no mysterious virus or complex biochemical metabolic disorder responsible in this instance. The basic elements are ignorance and carelessness, coupled with a proneness of certain age groups to be more likely to react unfavorably with the stress of their environment. Any effective program in home accident prevention must make use of these facts and attack the source accordingly.

* Presented at the Seventy-eighth Annual Meeting of the Louisiana State Medical Society, May 7, 1958, in Shreveport.

TABLE 1
CAUSES OF DEATH AMONG CHILDREN
(ages 1-14)

| | | | |
|---|---|---|---|
| Accidents | 10,991 | Nephritis | 501 |
| Cancer | 3,916 | Meningitis (nonmeningococcal) | 502 |
| Pneumonia | 2,899 | Heart Disease | 437 |
| Congenital malformations | 2,864 | Bronchitis | 394 |
| Gastritis, enteritis, colitis | 672 | Vascular lesions | 383 |

From: **Accident Facts**, 1958 Edition, National Safety Council.

TABLE 2
ACCIDENTAL DEATHS IN 1957

| Age Groups | 0-4 yrs. | 5-14 yrs. | 15-24 yrs. | 25-44 yrs. | 45-64 yrs. | 65 yrs. & over |
|---|---|---|---|---|---|---|
| All Accidents | 8,350 | 6,300 | 13,150 | 20,600 | 19,400 | 27,000 |
| Home Accidents | 3,800 | 1,300 | 900 | 2,100 | 3,300 | 14,600 |

From: **Accident Facts**, 1958 Edition, National Safety Council.

It is obvious that accidents about the home create their greatest havoc among the very young and the very old (Table 3). Those who are charged with the responsibility of caring for these individuals must be made aware of their peculiar susceptibilities and increase their vigilance accordingly. The number of infants and helpless senior citizens who perish as their home burns down about them should certainly alert those who care that these persons should never be left alone in the home. The hazards of falls to this group should call for a careful evaluation of their environment and the removal of all possible sources of difficulties. Recognition must be given to the normal growth and developmental characteristics of the child, especially in the 1 to 4 year old stage, as normal healthy inquisitiveness, coupled with hand-to-mouth activity, also normal, makes the toddlers a more likely candidate for poisoning, strangulation, or drowning.

### NATIONAL PROGRAMS

The development of an organized program directed at the reduction of home accidents has already begun on a national, state, and local level throughout the United States. The American Academy of Pediatrics, recognizing the importance of accidents as the leading killer of children after the neonatal period, in 1950, established its Committee on Aceident Prevention. To date the Committee activities have been primarily concerned with poisoning in children, as evidenced by the encouragement and establishment of numerous poison control centers throughout the country. In 1955, it published the first edition of "Accidental Poisoning in Childhood," listing more than 20,000 proprietary preparations and their toxic constituents.[1] Outstanding cooperation has been obtained with the American Medical Association's Committee on Toxicology and the American Public Health Association's Subcommittee on Chemical Poisons, resulting in the excellent Symposium on Childhood Poisons presented in joint session at the Chicago meeting in 1956.[2] The National Safety Council has been an invaluable aid, as its annual booklet entitled "Accident Facts"[3] has become the bible of accident prevention. Outstanding contributions have been made on a national level by other nonmedical organizations such as the National Board of Fire Underwriters, the Chemical Specialties Manufacturer's Association, the American Academy of Forensic Sciences, the Association of Casualty and Surety Companies, and many others. The large national insurance companies have published many excellent and attractive educational pamphlets which have been of great assistance. It is especially gratifying to note that the outstanding project for this year adopted by the Boy Scouts of America is entitled "Safety Good Turn-1958".[4] Those of us who are doing work in Scouting feel certain that considerable good will be derived from the actvities of these boys in the field of home safety.

### STATE PROGRAMS

On a state level, much is being done to

TABLE 3
DEATHS FROM HOME ACCIDENTS BY TYPE AND AGE, 1957

| Type of Accident | ALL AGES | 0 to 4 Years | 5 to 14 Years | 15 to 24 Years | 25 to 44 Years | 45 to 64 Years | 65 Years and Over |
|---|---|---|---|---|---|---|---|
| **Total** | **28,000** | **5,800** | **1,300** | **900** | **2,100** | **3,300** | **14,600** |
| Falls | 13,400 | 400 | 90 | 60 | 250 | 1,100 | 11,500 |
| Fire burns, and other deaths associated with fires | 5,400 | 1,050 | 550 | 300 | 850 | 1,100 | 1,550 |
| Mechanical suffocation | 1,400 | 1,250 | 40 | 20 | 20 | 40 | 30 |
| Firearms | 1,150 | 80 | 320 | 200 | 200 | 200 | 150 |
| Poisonings, solid or liquid | 1,200 | 350 | 40 | 60 | 300 | 350 | 100 |
| Poison gases | 900 | 70 | 60 | 100 | 200 | 270 | 200 |
| Other | 4,550 | 2,600 | 200 | 160 | 280 | 240 | 1,070 |

Source: Estimates by National Safety Council, based on data from the National Office of Vital Statistics and state health departments.

From: **Accident Facts,** 1958 Edition, National Safety Council.

bring the problems of accident prevention closer home, as it pertains to each geographical locality. As mentioned previously, the Academy of Pediatrics has organized its State Chapters to take the lead in this field. Here in Louisiana we have been fortunate in having an active and devoted group, headed by Dr. Bruce Everist of Ruston. As in the majority of the states, the basic theme has been along the lines of the development of poison control centers and allied activities, with such a center soon to open in New Orleans in connection with the L.S.U. School of Medicine. Other states have expanded their programs into different fields. The State Department of Health in Minnesota recently conducted a survey of home accidents throughout the state, making a valuable contribution along these lines.[5] Another outstanding example has been developed in New Jersey, where a joint effort with the State Department of Health, Congress of Parent Teacher Associations, State Safety Council, and the State Medical Society has completed an excellent child safety project through the use of a carefully devised multiple-choice questionnaire.[6] The 30,000 replies obtained will bring benefits far beyond the actual borders of the state concerned with the survey, just as we hope our efforts here in Louisiana will reap a broader harvest. Other organizations in Louisiana have begun to give evidence of an interest in this field. The recent convention in Alexandria of the Public Health Association devoted its entire program to accident prevention, and the annual meeting of the Louisiana Safety Association has included for the past several years a special section on home safety.

### LOCAL PROGRAMS

The local effects of these national and state-wide efforts have produced a number of favorable results, varying again with the geographical locality and the size of the community, as well as the interest of its individual citizens. The New York City Department of Health has recently set up a Task Force on Accident Prevention, which in great part has concentrated on home safety.[7] Another excellent program was developed in New Bedford, Massachusetts.[8] Under a grant from the Hood Dairy Foundation, a local advisory committee was formed consisting of physicians, druggists, legislators, clergymen, school officials, and other interested individuals. The membership was changed from time to time, and functioned as a forum for discussion of the general problems of accident causation. Here in Shreveport, through the cooperation of the local Safety Council, we have developed a program for education of baby sitters, an exhibit at the State Fair, an annual forum with the Health Council, numerous television programs, and a motion picture on home safety which received a citation from the National Safety Council. This fall we have plans for a city-wide campaign in cooperation with the Boy Scouts in their Safety Good Turn. The Ruston survey under Dr. Everist is another excellent example of what can be accomplished locally, regardless of the size of the community.

### INDIVIDUAL RESPONSIBILITY

Throughout all this discussion of home accident programs conducted on a national, state and local level, it must be obvious that no such program will succeed beyond the efforts of the individual or individuals whose interest and devotion afford the prime motive factor in the campaign. The physician himself must therefore recognize and accept the responsibility which is the natural result of his unique position in society. No other person commands the respect of the individual patient or parent, and no one can better bring the lesson of safe living home to that patient or parent than the family physician. Here is an opportunity for public service and preventive medicine unparalleled in medical practice. For as was stated before, one is not dealing with something unknown—the accumulated facts are at hand from many years' experience.

One needs no expensive electronic microscope or cobalt machine to develop a safety vaccine—it is already here to be

used. It can be administered for the children, along with feeding instructions, habit development suggestions, and other bits of advice given on regular visits. This vaccine has the advantage of being painless, and yet may be more life-saving than the routine of D-P-T injections now given. If allowed to paraphrase one of the pioneers in this field, Dr. Harry Dietrich,[9] we might consider this vaccine also as "D-P-T"—Discipline, Prediction and Time. Discipline is that way of life in which the family, instructed and guided by their physician, develops an everyday manner of living governed by common sense and good habits in which safety becomes an everyday integral factor. Prediction involves the use of all the statistics and facts previously mentioned, taking special cognizence of the hazards involving those specific age groups which show a predilection to certain types of accidents. Time is the third—and perhaps the most important unit. If the physician can divert the parents away from unnecessary worrying concerning relatively unimportant things such as premature toilet training, competition in growth and development, the sequence of eruption of teeth, and countless other imaginary modern problems, then perhaps some of this emotional energy and precious time can be spent in consideration of a much more valid and important matter of concern—accident prevention. The physician himself must take the necessary time to give preventive instruction at each regular visit by the parent and to notice hazards about the home environment while he is making home visits—the unlit stairs, the slippery rug, the open electrical socket, and other dangers he might notice. When prescribing any type of medication to any member of the family, he must warn of its potential dangers to children and insist that it be kept locked up, not just supposedly hidden away.

Just as the development of home accident programs can be traced from the national through the state and local level down to the individual physician, so must it be traced in a reciprocal manner in order to be proper and complete. Each of these well-organized efforts had its inception in the mind of a devoted and energetic physician. The prestige and backing of these important national organizations is now available to those who would take advantage of them. A pebble cast in the water in some small Louisiana town might in ever-widening ripples soon become an important drive of national scope. The ideas of some Louisiana physician might be developed and expanded into a program that would benefit the lives of many other individuals far removed from his own patients. This is an opportunity indeed rare in the private practice of medicine—but it is more than just an opportunity, it is a pressing moral obligation.

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# CAUSE OF DEATH IN SURGERY OF THE NEWBORN;

## Emphasis on Prevention of Aspiration *

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During the last three years on the L.S.U. Pediatric Surgery Service of the Charity Hospital of New Orleans, there have been 74 patients under one month of age, and 28 of these infants died in the hospital. This small group, amounting to less than 6 per cent of the total admissions, accounted for over 60 per cent of all the deaths on the service during this period.

This study includes all infants who were operated on or diagnosed as having a surgical condition on or before the thirtieth day of postnatal life. Of the 74 patients in this series, 12 were not operated on. Some were not considered suitable candidates for surgery; others died before the general condition could be improved sufficiently to consider operation; and in some, surgery was not necessary or was postponed until a later date.

The entire group of infants will be considered before discussing the causes of death in those who succumbed.

The conditions occurring in these patients may be divided into five categories:

A. Early Congenital Anomalies—abnormalities beginning early in fetal life and requiring surgery early in the newborn period;

B. Late Congenital Anomalies — those originating late in fetal life and requiring treatment late in the neonatal period (in this group are included pyloric stenosis and Hirschsprung's disease, in which the time of origin is not known);

C. Non-Congenital Emergencies;

D. Trauma;

E. Miscellaneous.

### EARLY CONGENITAL ANOMALIES

In the 37 patients with early congenital anomalies the average age was 4 days and the mortality 57 per cent. (Table 1.) Over half the deaths were due to pulmonary complications—atelectasis and pneumonitis. The anomalies in this group were congenital obstructive lesions of the alimentary tract (atresia or stenosis of the esophagus and intestine, imperforate anus, and malrotation), perforation of the stomach as a result of an abnormality in development, omphalocele, Siamese twins, and multicystic kidney presenting as an abdominal mass.

### LATE CONGENITAL ANOMALIES

There were no deaths in the 17 patients with late congenital anomalies, which were

TABLE 1
EARLY CONGENITAL ANOMALIES
57 PER CENT MORTALITY

| Anomaly | Patients | Premature | Other Anomalies Major | Other Anomalies Minor | Deaths | Cause of Death Pulmonary | Cause of Death Multiple Anomalies | Cause of Death Other |
|---|---|---|---|---|---|---|---|---|
| Esophageal Atresia | 10 | 5 | 3 | 2 | 7 | 7 | | |
| Duodenal Obstruction | 7 | 5 | 3 | 2 | 4 | 3 | 1 | |
| Jejunal Obstruction | 3 | 3 | | | 3 | 1 | | 2 |
| Colon Obstruction | 1 | | | | 0 | | | |
| Imperforate Anus | 3 | | | | 0 | | | |
| Stomach Perforation | 2 | | 1 | | 2 | | 1 | 1 |
| Malrotation | 1 | 1 | | | 1 | 1 | | |
| Omphalocele | 6 | 3 | 3 | 3 | 3 | | 2 | 1 |
| Siamese Twins | 2 | 2 | 1 | | 1 | | 1 | |
| Multicystic Kidney | 2 | | | | 0 | | | |
| Total | 37 | 19 | 11 | 7 | 21 | 12 | 5 | 4 |

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pyloric stenosis, incarcerated inguinal hernia, and Hirschsprung's disease. (Table 2.) The average age of these infants was 23 days.

### NON-CONGENITAL EMERGENCIES

Non-congenital emergencies early in the neonatal period accounted for 6 patients with 100 per cent mortality. (Table 3.) In this group are (1) two infants with paralytic ileus due to sepsis, (2) a nine-day old, two-pound baby with a bleeding gastric ulcer, and (3) three two-pound infants with a condition we have labeled constipation-dehydration. These dehydrated patients apparently had insufficient enzymes to digest the small milk feedings they were given, and they died of intestinal obstruction produced by plugs of inspissated milk curds throughout the whole intestinal tract. At autopsy there was increased fibrosis in the pancreas of one of these patients.

### TRAUMA

All 3 patients treated for trauma survived. (Table 4.) These were (1) a three-week old baby with a large hematoma of the liver resulting from birth trauma, (2) a three-week old colored male with a gunshot wound of the abdomen, and (3) a male infant with a recto-urethral fistula resulting from cystoscopy and multiple catheterizations.

### MISCELLANEOUS

The miscellaneous group (Table 5.) included (1) breast abscess, (2) negative exploratory laparotomy, (3) meconium constipation, (4) preauricular appendage, and (5) draining umbilicus. The only death in this group occurred in (6) a three-week old baby with a cystic hygroma of the axilla who developed diarrhea, then pneumonia, and finally died of viral hepatitis and *E. coli* septicemia thirteen days after operation.

### CAUSE OF DEATH

The mortality of the entire group of 74 patients was 38 per cent (Table 6.) Of the 62 patients operated on, 22 died after surgery, a mortality of 35 per cent.

Table 7 lists the causes of death in the 28 patients who succumbed. Of the 25

TABLE 2
LATE CONGENITAL ANOMALIES
NO DEATHS

| Anomaly | Patients | Premature | Other Anomalies | Comment |
|---|---|---|---|---|
| Pyloric Stenosis | 12 | 3 | 1 | 1 Wound Infection<br>1 Incisional Hernia |
| Incarcerated Hernia | 4 | 1 | | 1 Exp. Lap. Obstruction |
| Hirschsprung's Disease | 1 | | | Not Operated |
| Total | 17 | 4 | 1 | |

TABLE 3
NON-CONGENITAL NEONATAL EMERGENCIES
100 PER CENT MORTALITY

| Condition | Patients | Premature | Operated | Cause of Death |
|---|---|---|---|---|
| Paralytic Ileus (Sepsis) | 2 | | 2 | 1 Fecal Fistula<br>1 Enterocolitis |
| Gastric Ulcer | 1 | 1 | | 1 Hemorrhagic Pneumonia |
| Constipation-Dehydration | 3 | 3 | 1 | 1 Perforation Ileum<br>2 Intestinal Obstruction |
| Total | 6 | 4 | 3 | 6 |

TABLE 4
TRAUMA
NO DEATHS

| Condition | Patients | Operated | Comment |
|---|---|---|---|
| Hematoma Liver | 1 | 1 | Neonatal Shock |
| Gunshot Wound Abdomen | 1 | 1 | 3 Perforations Ileum |
| Recto-urethral Fistula | 1 | 1 | 2° cystoscopy |
| Total | 3 | 3 | |

patients with congenital intestinal obstruction (including tracheoesophageal fistula) 15 died, and 12 of these deaths were due to pulmonary complications — atelectasis resulting from aspiration of saliva and respiratory tract secretions, or pneumonitis from aspiration of vomitus. Aspiration pneumonitis caused the death of 3 of these infants before surgery could be attempted.

Multiple anomalies incompatible with life accounted for 5 postoperative deaths and probably contributed to the death of at least 5 other infants who died primarily of pneumonitis. Only 2 patients survived surgery with major anomalies other than those for which they were operated.

The miscellaneous causes of death include (1) sclerema in a fullterm baby following repair of an omphalocoele, (2) two cases of malnutrition resulting from extensive small bowel resection, (3) the three cases of constipation - dehydration previously mentioned, and (4) four cases of infection —peritonitis following perforation of the stomach, bacteremia after resection of a cystic hygroma, and two cases of sepsis and paralytic ileus simulating intestinal obstruction.

## DISCUSSION

In this series, the deaths due to multiple congenital anomalies were unavoidable in our present state of knowledge, and most of those due to miscellaneous causes were not preventable at the time the patients were seen. However, the largest group of deaths, those due to pulmonary complications, should be preventable.

The one most important factor in prevention of death from aspiration is early diagnosis and treatment of congenital obstructive lesions of the alimentary tract. (12 of the 13 pulmonary deaths occurred

TABLE 5
MISCELLANEOUS
9 PER CENT MORTALITY

| Condition | Patients | Premature | Comment |
|---|---|---|---|
| Breast Abscess | 5 | | Incision & Drainage |
| Negative Exp. Lap. | 2 | | 1 Possible Duodenal Obstruction<br>1 Possible Ruptured Liver |
| Meconium Constipation | 1 | 1 | Colon Obstruction |
| Preauricular Appendage | 1 | | Excised |
| Draining Umbilicus | 1 | | Possible Urachus Investigated |
| Cystic hygroma axilla | 1 | | Died (Bacteremia) |
| Total | 11 | 1 | 9 Operated |

TABLE 6
NEONATAL SURGERY
38 PER CENT MORTALITY

| Condition | Patients | Premature | Other Anomalies Major | Other Anomalies Minor | Operated | Deaths | P.O. Deaths |
|---|---|---|---|---|---|---|---|
| Early Congenital Anomalies | 37 | 19 | 11 | 7 | 32 | 21 | 18 |
| Late Congenital Anomalies | 17 | 4 | 1 | | 15 | 0 | |
| Non-Congenital Emergencies | 6 | 4 | | | 3 | 6 | 3 |
| Trauma | 3 | | | | 3 | 0 | |
| Miscellaneous | 11 | 1 | | | 9 | 1 | 1 |
| Total | 74 | 28 | 12 | 7 | 62 | 28 | 22 |

TABLE 7
CAUSE OF DEATH

| | | Pulmonary | Multiple Anomalies | Other | Total |
|---|---|---|---|---|---|
| Early Congenital Anomalies | Operated | 9 | 5 | 4 | 18 |
| | Not Operated | 3 | | | 3 |
| Non-Congenital Emergencies | Operated | | | 3 | 3 |
| | Not Operated | 1 | | 2 | 3 |
| Cystic Hygroma | Operated | | | 1 | 1 |
| Total | | 13 | 5 | 10 | 28 |

in this group of patients.) Any infant, particularly a premature one, who is difficult to resuscitate at birth or who exhibits intermittent cyanosis and excessive mucus early in the newborn period should be suspected of having atresia of the esophagus with tracheo-esophageal fistula until the diagnosis has been excluded by passing a catheter through the esophagus and into the stomach. And every newborn who vomits, particularly if the vomitus contains bile, should have an immediate x-ray of the abdomen to rule out congenital intestinal obstruction.

If tracheo-esophageal fistula with esophageal atresia is suspected because of inability to insert a naso-gastric tube, the diagnosis should be confirmed by fluoroscopy with lipiodol. The patient should immediately be placed in an atmosphere of high humidity, and the nose and mouth and pharynx kept clear of saliva and mucus by frequent suction. For this purpose, an intact #8 French catheter is used, and the suction machine carefully regulated at seven or eight pounds of negative pressure. (Stronger suction will cause bleeding from the mucous membranes.) The manipulation associated with the suctioning will stimulate the cough reflex (which is notably poor in these small patients). However, an attempt should be made to avoid gagging the baby with the catheter, for when these infants vomit, gastric juice is regurgitated directly into the trachea.

Once the diagnosis of intestinal obstruction is made, x-ray studies with contrast material are specifically contraindicated. The infant should be placed on his abdomen and immediate decompression of the gastrointestinal tract undertaken. In these small patients the ordinary urethral catheter is superior to the regular Levine tube. The catheter, with extra holes cut to allow better drainage, is more easily kept open, since it is shorter than the Levine tube. It must be irrigated frequently, however, to prevent plugging with mucus.

Gravity drainage and intermittent aspiration of the catheter with a syringe are preferable to strong constant suction, but very gentle constant suction may be obtained by inserting a #25 needle into the tubing connecting the catheter to the suction machine.

The importance of adequate preoperative decompression of the gastrointestinal tract cannot be over-emphasized. In the present series, there was not a single instance of aspiration on the operating table or in the recovery room, but patients with inadequate decompression have been known literally to drown in vomitus during this critical period.

Frequent suction of the nasopharynx is almost as important in intestinal obstruction as in tracheo-esophageal fistula. Newborn infants have poor cough reflexes and may aspirate the increased secretions resulting from the irritation of the naso-gastric tube.

Additional preoperative measures for both tracheo-esophageal fistula and intestinal obstruction include minimal but adequate hydration, transfusion if necessary, antibiotics, and administration of an adequate drying agent before induction of anaesthesia. The smaller the infant, the more important is this last measure.

Anesthetic and surgical technique will not be discussed, except to emphasize gentle handling of tissue by both surgeon and anesthetist and to urge complete decompression of the small bowel before closing the abdomen.

Postoperatively, all these patients continue to require an atmosphere of high humidity, suction of the nasopharynx, and the prone position. If the baby is not placed on a pillow, there is no danger of suffocation. In addition, in the infant with intestinal obstruction the decompression should be continued until normal function of the gastrointestinal tract has been established.

Even with the most expert nursing care, however, these tiny patients, who are critically ill, who have undergone major surgery, and who have poor gag and cough reflexes, will often aspirate—usually with disastrous results. For this reason, the use of gastrostomy in congenital intestinal obstruction is recommended. A #16 or #18 mushroom catheter can be sutured

into the stomach at the time of laparotomy with minimal increase in operating time, and this large tube will provide much more adequate drainage than can be obtained with the #8 or #10 naso-gastric tube. Furthermore, it eliminates the increased secretion due to irritation of the catheter in the nose, pharynx and esophagus. It can be used throughout the period of postoperative ileus and during the week or ten days until effective peristalsis is established in the dilated and hypertrophied segment proximal to the obstruction. Later, feedings may be administered through the tube if desired. Removal of the gastrostomy tube, usually two to three weeks after operation, is quite simple and uncomplicated.

It should be noted that the gastrostomy is recommended only for congenital obstructive lesions below the pylorus. In tracheo-esophageal fistula, normal peristalsis is resumed early in the postoperative period, and gastrostomy is indicated only in the event of unsatisfactory esophageal anastomosis and is used for feeding, not decompression.

This use of gastrostomy in the postoperative newborn infant was suggested by Doctor James D. Rives, Professor and Head of the Department of Surgery of the Louisiana State University School of Medicine. It has been used in 3 patients with considerable simplification of the postoperative care and most gratifying results.

In adult patients, atelectasis or aspiration immediately raises the question of bronchoscopy or tracheostomy, but these procedures are usually contraindicated in infants. The respiratory passages of the newborn infant are so small that postoperative tracheal intubation of any kind is usually traumatic and productive of sufficient edema to seriously compromise the airway. In these patients, prevention of pulmonary complications is imperative, for attempts at curative measures may be fatal.

SUMMARY

The most frequent cause of death in 74 newborn surgical patients was aspiration of respiratory secretions and vomitus, resulting in atelectasis and pneumonitis, and occurring most often in congenital obstructive lesions of the alimentary tract. Early diagnosis and treatment, intermittent postoperative suction of the nasopharynx, and decompression of the gastrointestinal tract will aid in lowering the mortality rate in these infants.

## FERNING PROCESS AS NOTED IN CERVICAL SMEARS AND ITS RELATIONSHIP TO OVULATION AND PREGNANCY *

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Since Smith,[1] in 1855, first described the physical properties of cervical mucus, there has been considerable investigation of the physical, chemical, bacteriological, and physiological changes of this secretion. The description of the physical changes was first attributed to Seguy and Vimeux.[2] The quantitative studies were presented in 1944 by Viergiver and Pommerenke.[3] The latter correlated the volume and viscosity of cervical mucus with the basal body temperature. Cyclic changes in the endocervix and its glands have been studied histologically with variable results by several investigators, notably among them Papanicolaou, Traut, Marchetti, and Topkins.[4] Bacteriological and anti-agglutinating factors have been reported by Baxton and others.

It remained for Papanicolaou in his reports of 1945[5] and 1948 to describe a certain type of crystallization when cervical mucus was obtained during certain phases of the menstrual cycle and allowed to dry on a glass slide. This peculiar crystallization phenomenon has been variously termed arborization, palming, or

* Presented at the Seventy-eighth Annual Meeting of the Louisiana State Medical Society, May 6, 1958, in Shreveport.

ferning. Landerstrom-Land [6] and Zondek [7] have studied this phenomenon and have concluded that it is due to mucin and sodium chloride. A peculiarity of this phenomenon is that it will only form in the presence of estrogen unopposed by progesterone. Progesterone inhibits this formation. In the normal menstrual cycle it is possible to reproduce the ferning phenomenon, even in the presence of progesterone, by giving large amounts of estrogen, but during pregnancy even very large doses have failed to do so. During pregnancy a special mechanism exists that inhibits the excretion of mucin containing electrolytes essential for ferning.

In the gynecologist's quest for more simple methods of determining estrogen activity, ovulation and early pregnancy detection, it was natural that studies of cervical mucus should be undertaken in the hope that it would reflect endocrine changes. Endometrial biopsies, estrogen, and pregnanediol determinations, vaginal smears, and temperature charts are of proven value, but the expense, availability, and time involved to obtain the desired results have curtailed their extensive use. Roland,[8] Zondek,[7] Forman,[9] and others have studied the fern test during the menstrual cycles of normal women and have shown in general, that the cervical mucus obtained in the premenstrual and postmenstrual phase contains abundant vaginal and cervical epithelial cells, leukocytes and mucus in patches or threads. There was no ferning. From D-8 through D-22, however, when the slide is allowed to dry, it crystallizes and forms a typical arborization pattern showing a fascinating pattern of flowers and leaves resembling fern or palm leaves. Campos de Paz [10] and Lewis have correlated this ferning with the penetrability of the sperm.

### TECHNIQUE

The technique which I have employed in this study is as follows: A bivalve speculum is inserted into the vagina to expose the cervix. The cervix is wiped clean with cotton on a sponge holder. Cervical mucus is aspirated and immediately placed on a dry clean slide and dried by heat. It is read immediately after the examination of the patient is completed. It is not allowed to dry at room temperature and is not read later. These are important points because Campos de Paz has shown that humidity will influence the result. Also, the entire picture changes in several hours. (Figures 1 & 2)

In the interpretation of this test, I report the slide as negative if no areas of ferning are found on a routine exami-

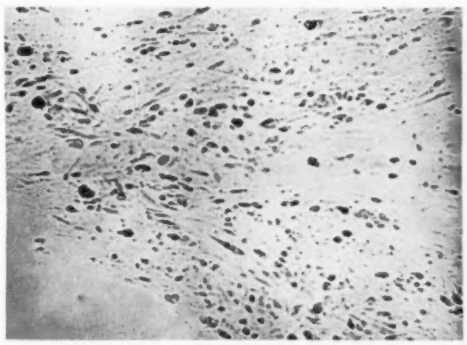

Figure 1.—Negative fern test.

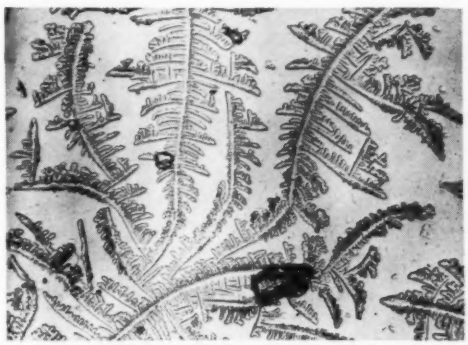

Figure 2.—Positive fern test.

nation of the slide under low power magnification. If a slide is negative in the overall picture with but an isolated area of ferning it should be reported as showing a trace, and for purposes of interpretation bears the same significance as a negative slide. If the entire slide shows areas of early ferning it is reported as plus one, two, and three, up to the typical plus four picture of full-blown ferning.

Shanks [11] and several other investigators have questioned the result of Roland and Zondek. Because of their conflicting re-

TABLE 1
FERN TEST RESULTS IN 30 NORMAL GYN. PATIENTS

| Menstrual Day Fern | 1—7 | 8—10 | 11—22 | D-22 Menses |
|---|---|---|---|---|
| | Neg. to trace | +2 to +4 | +4 | Neg. to trace |

ports, I reviewed their results and technique and found that (1) the slides were dried in air and, (2) they were read several hours after they were obtained. Further, Shanks and others consider a trace of ferning as an argument against a negative test. I feel that this is a difference of interpretation.

### RESULTS

Table 1 demonstrates my results in 30 normal menstruating women who were being treated for pathology other than menstrual irregularity. This represents well over 150 tests that were compiled by the skatter-graph method. Roland had compiled his results by testing the cervical mucus at definite intervals in the same women throughout the menstrual cycle. This is undoubtedly a more scientific approach but is hardly possible or practical in private patients. Nevertheless, my smears agree, in general, with the results of the above investigators. Smears taken shortly after the menses present a picture of cellular debris, leukocytes, and cervical cells. Shortly thereafter, traces of the ferning mechanism appear and gradually increase in intensity until at about D-10 the fully developed fern covers the entire slide. Conversely, on D-21, the ferning mechanism begins to diminish and is reconverted to the negative smear after D-22. Accordingly, I recommend that the test be run on D-10 and D-24. If a positive smear on D-10 is converted to negative by D-24, ovulation can be presumed because of the inhibiting influences of progesterone.

### RESULTS IN PREGNANCY

Because of the lack of ferning in pregnancy, it should be a valuable test for early pregnancy. Roland [8] claims 99 per cent accuracy, but fails to state how many cases were early pregnant. Zondek [12] ran tests on 226 pregnant women in the first trimester. Eighty-eight per cent were completely negative, 11.5 per cent showed a +1 ("trace" in my series) ferning. An interesting corrollary of this study is that of the 26 pregnancies that showed slight ferning, 15 pregnancies terminated unfavorably (roughly 58 per cent). His conclusion was that such a test signifies placental insufficiency and that the fern test may indicate the prognosis in a given pregnancy. This study was primarily done to test the validity of this hypothesis.

TABLE 2
RESULTS IN 85 PATIENTS FIRST SEEN UNDER 12 WKS.

| Fern Test | No. of Patients | %Series | %Tests |
|---|---|---|---|
| Negative | 46 | 54.1 | 77.9 |
| Trace | 13 | 15.3 | 22.0 |
| Not done | 26 | 30.5 | |

Of 59 patients with fern tests, 40 were in the first 8 weeks

Table 2 shows that in the last 85 pregnancies seen in the first twelve weeks, fern tests were done on 70 per cent of the cases. Roughly 22 per cent of these showed a trace of ferning. Table 3 shows

TABLE 3
PATIENTS WITH POSITIVE FERN
13 PATIENTS

| Follow-up | | |
|---|---|---|
| Delivered | 4 | |
| Preg. (Past 16 Weeks) | 7 | |
| Preg. (Still Early) | 2 | |
| Abortion | 0 | |
| Ectopic Gestation | 0 | |
| Fetal low | | 0 |

that there was no fetal loss in the 13 patients who showed a trace of ferning. On the other hand, table 4 shows a 13

TABLE 4
PATIENTS WITH NEGATIVE FERN
46 PATIENTS

| Follow-up | | | |
|---|---|---|---|
| Delivered | 16 | | |
| Preg. (Past 16 weeks) | 15 | | |
| Preg. (Still early) | 5 | | |
| Lost track of | 4 | | |
| Abortion (3 missed abort.) | 6 | | |
| Ectopic Preg. | 0 | | |
| Fetal loss | | (6) | 13.0% |

per cent fetal loss in the group with negative tests. These results would cast serious doubt on the assumption of Zondek, that such a test bears a bad prognosis. However, an interesting finding shown in Table 5 is the return of the ferning phenomenon subsequent to the death of the fetus in the first 3 cases. This suggests that a test which was first negative and later becomes positive may signify a withdrawal of the pregnancy hormones.

Further study will have to be done. Conversely, however, several cases which have progressed uneventfully after a threatening episode, have continued to show a negative pattern.

### STUDY OF STERILITY

The value of this test in the study of sterility problems has been well exemplified by Campos de Paz,[11] Furman,[10] and Lewis. Study of sperm penetrability by postcoital tests has shown that the mucus is far more penetrable during the +4 ferning stage. In a review of their work, I find that no mention is made of the viscosity of the mucus. In my own experience, I find that a strongly positive fern test may still be associated with a high viscosity and suggest that the viscosity of the mucus, which is essential for good penetrability, is not always perfectly correlated with a strongly positive fern. This would be expected since the fern test is usually strongly positive from about D-11 or D-12 through D-21, while the viscosity would be thin only for a shorter period of time. Temperature charts also show this strongly positive fern test both before and after ovulation.

### ENDOMETRIAL STUDIES

Table 6 shows the correlation of the fern tests with the endometrial biopsies. Basal body temperature charts were available in 8 of these patients. There is a clinical and histological correlation in

TABLE 5
FETAL LOSS CASES (6)
CORRELATION OF FERN TESTS

| | Weeks Preg. 6-8 | 9-10 | 11-12 | 12-16 | 18 | | Frog Test | |
|---|---|---|---|---|---|---|---|---|
| E.F. | | Neg. | Tr. | +2 | | | Neg. 16 wks. | Missed abortion |
| G.V. | | | | Neg. | Neg. | +1 | Neg. 20 wks. | Missed abortion |
| L.A. | Neg. | Neg. | | +1 | +1 | | Neg. 12 wks. | Missed abortion |
| C.M. | Neg. | | | | | | | Aborted (8 wks.) |
| R.L. | Neg. | | | | | | | Aborted (12 wks.) |
| S.C. | | Neg. | | | | | | Aborted (12 wks.) |

TABLE 6

| | | Age | Menses Cycle | Days of Cycle and Results of Fern | | | | Day of Endo. Biopsy | Types of Endometrium | Correlation with B.B.T. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | every | | | | | | | |
| 1. | J.K. | 31 | 20-28 | 19 | +3 | 22 | Neg. | 28 | Sec | |
| 2. | B.B. | 23 | 26-35 | 12 | +3 | 16 | Tr. | 26 | Sec | Yes |
| 3. | R.B. | 25 | Irreg. | 17 | +4 | 24 | Neg. | 26 | Sec | Yes |
| 4. | C.F. | 30 | 28-30 | 8 | +4 | 22 | Neg. | 24 | Sec | |
| 5. | F.R. | 34 | 26-28 | 12 | +4 | 17 | Tr. | 26 | Sec | Yes |
| 6. | D.N. | 24 | 28-30 | 10 | +4 | 24 | Tr. | 26 | Sec | |
| 7. | B.T. | 26 | 24-28 | 13 | +4 | 22 | Tr. | 27 | Sec | Yes |
| 8. | S.T. | 34 | 23-25 | 10 | +4 | 19 | Neg. | 20 | Sec | |
| 9. | R.L. | 28 | 24-28 | 14 | +4 | 22 | Tr. | 25 | Sec | Yes |
| 10. | D.K. | 18 | Irreg. | 15 | +4 | 27 | +3 | 28 | Anovul. | Yes |
| 11. | A.K. | 23 | 21-30 | 9 | +4 | 24 | +3 | 24 | Anovul. | Yes |
| 12. | L.L. | 19 | 28-30 | 16 | +4 | 24 | +1 | 24 | Anovul. | |
| 13. | E.T. | 31 | 28-30 | 13 | +4 | 28 | +4 | 28 | Sec | No |
| 14. | E.C. | 17 | Irreg. | 13 | +4 | 20 | Neg. | | Pregnant | |
| 15. | G.L. | 45 | 23-24 | 10 | +1 | 18 | +3 | 18 | Hyperplasia | |
| 16. | E.W. | 41 | Amenorrhea 4 mo. Ferns | | | | +4 | 120 | Hyperplasia | |
| 17. | N.L. | 26 | Amenorrhea 4 mo. Ferns | | | | Tr. | 120 | Hyper. only few glands | |

all but 1 of these patients.

The first 9 cases represent the change from a positive to a negative test in the premenstruum and correlate very well with the endometrial findings indicative of ovulation. It will be noted that the women with the shorter cycles usually show ferning earlier in the cycle and also revert to a negative pattern earlier.

The persistence of the positive test in cases 10 through 12 also correlated with the endometrial diagnosis of anovulatory menstruation. Case 12 probably represents a diminishing estrogen level in an anovulatory cycle, but is still a + 1 positive.

Case 13, however, was shown to have secretory endometrium in spite of continued ferning. The temperature chart also showed evidence of ovulation. This woman had a very thin peculiar mucus at all times that was almost of the viscosity of water. Her cervix had multiple large Naboth's cysts which may have masked the true picture. I have recently performed a conization on this cervix. This was the only case that failed to show correlation between the endometrium and the fern test in this series.

The persistence of the ferning mechanism in cases 15 and 16 suggests the absence of progesterone in the premenstruum in one case, and over the length of four months in the other. Endometrial studies in both cases showed hyperplasia.

The persistent trace of ferning in case 17 represents the effect of a low estrogen level secondary to ovarian failure. This 26 year old woman is an example of a case of Sheen's syndrome secondary to obstetrical shock. Her urinary estrogen levels have been persistently low.

### OTHER USES OF TEST

Table 7 shows several other interesting cases of the use of the fern test in clinical practice. L.W. was a 28 year old female who had a history of irregular menses in the past, but had been regular for the past few years. On a routine examination on D-14, because of a negative fern test, I was able to predict to her that her menstrual irregularity was returning. On D-100 her test was still + 4, showing a lack of ovulation. She responded well to progesterone therapy. E.W., a 41 year old white female, presented herself on D-57 because she thought she was pregnant. The persistent fern test suggested hyperplasia, which was proven by endometrial biopsy on D-120. E.T. was a 31 year old sterility problem who deserted my care when told she was not pregnant on D-65 because of the + 4 fern test. She was told that she was pregnant elsewhere but returned to me six months later after a diagnosis of pseudocyesis was made at five and a half months by her second doctor.

Case B.D. was an example of oligomenorrhea with menstrual cycles every four to six months since menarchie. A diagnosis of pregnancy, very early, was made on D-98 when she presented herself because of her menstrual irregularity. This case has since been delivered of a viable normal infant.

### CONCLUSIONS

In conclusion, I feel that the fern test is a very simple, rapid, and inexpensive test that can be done in any office in less than two minutes. The following conclusions would be suggested, but further clinical and laboratory tests are required to reach a definite conclusion.

1. In the sterility work-up, a negative

TABLE 7

| | | | | | | |
|---|---|---|---|---|---|---|
| L.W. | Irregular menses (Past.) | D-14 | D-100 | | Prog. | D-108 |
| 28 yrs. | Regular for past years | Neg. | +4 | | Therapy | Menses |
| E.W. | Menses Reg. 25-27 day | D-57 | D-87 | D-94 | D-120 | ▲Hyperplastic |
| 41 yrs. | Cycles | +4 | +4 | trace | +4 | Endometrium |
| E.T. | | D-65 | Pseudocyesis | | 6 mos. later | |
| 31 yrs. | Menses regular | +4 | | | +3 | |
| B.D. | Menses very irregular | D-98 | Uterus Sl. Soft | | Pregnant | |
| 22 yrs. | | Neg. | Early preg. | | | |

fern test would suggest ovulation has occurred if a previous fern test had been positive.

2. A persistent positive test would suggest no ovulation or hyperplasia.

3. A persistent mildly positive test would suggest hypoestrogenic effect.

4. In a normal menstruating woman who is late for her menses, a negative test is a highly presumptive evidence of pregnancy. If no menses occurs in one week, she is almost certainly pregnant.

5. A trace of fern does not seem to be a test of placental insufficiency.

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DISCUSSION

Dr. S. V. Ward (New Orleans): It has been a pleasure for me to read Dr. McCune's paper and to hear its presentation. In fact, it was this paper alone which precipitated my interest in "ferning" and which made us adopt it as an office adjunct. I have pulled from my files 50 to 60 cases on whom we have observed the presence or absence of this phenomenon.

In the first place, it is a completely simple test that anyone can do with a slide and a microscope, a match and a minute. We use a cotton applicator twisted just into the external os of the cervix after wiping away any excessive mucus. Jelly and digital examination preceding the taking of the smear do not seem to affect it.

If there is any trick to the interpretation it consists of looking at a number of the tests to be able to separate the "trace" from the 1-2-3 and 4 plus. My technician and I have worked out a percentage method whereby they are listed 10, 20, 50 per cent, etc. or completely positive (100 per cent) which is 4 plus in the essayist's evaluation.

I feel there may be something more to the "trace" positives which he puts into the category of the negatives but have not yet determined the significance, if any. We would call this a 10 per cent positive. In its use in sterility studies, I envision this simple, painless test virtually replacing the endometrial biopsy to determine ovulation in the run-of-the-mill case, especially when combined with the temperature curve. Only in the questionable cases does biopsy seem necessary.

In the use of the ferning phenomenon in ovulation, the essayist states that a test run on the tenth and twenty-fourth days of the menstrual cycle should change from positive to negative. I presume that this is based on an average cycle length of twenty-eight days. However, since a woman ovulates then menstruates approximately two weeks later, it might be better to base this on a given length of time prior to menstruation than one after menstruation. In other words, taking these tests on the tenth and twenty-fourth days might be inaccurate when run on a woman with a twenty-four day cycle as compared with a woman with a thirty-eight day cycle. Possibly then, it might be better to say that in determining the presence or absence of ovulation, fern tests should be taken eighteen days and four days prior to the expected onset of a menstrual period.

It should be emphasized that though the progestational action makes the ferning disappear this is not a sudden action at the time of ovulation like the temperature curve, but rather the level of progesterone builds up until there is a turning point in the crystallization of the endocervical mucus. It has been shown that the new synthetic progestational drugs, Enovid and Norlutin, will change the mucus from positive to negative when given in adequate doses.

The essayist points out that Zondek's study shows 26 patients with ferning in pregnancy, 15 of whom aborted. Dr. McCune's results do not bear this out. However, my small series of cases does indicate this same conclusion as illustrated by the following facts.

In 22 patients whose menstrual periods were from one to eight weeks overdue, the ferning test was negative and the patients have proved to be pregnant and have continued their pregnancies. In one case there was a patient overdue who had a negative test and who aborted. Therefore, 22 out of 23 pregnant patients with negative tests have carried their pregnancies.

In 7 patients whose menstrual periods were from one to eight weeks overdue, one or more tests have been run and shown to be positive, the patients are not pregnant and it is presumed that these patients largely have endometrial hyperplasia.

However, in 5 cases whose periods were overdue, the test was positive and the patients aborted. No negative test (positive for pregnancy) was seen in spite of repeated checks in each of these 5 patients. Four patients who were overdue showed positive tests but which became negative and all have carried normally. Therefore, 5 of 9 with positive tests aborted. There were several patients

who were overdue their periods and who had negative tests (in whom pregnancy was therefore suspected) but it was seen that the patient menstruated shortly after this and therefore the test was rightly negative. Dr. McCune points out that if no menstrual period occurs within one week after a negative test is found in a patient whose menstrual period is overdue, that pregnancy should be strongly suspected, and I agree. His conclusions are all significant and indicate to us how we may put this simple test to practical use in our office every day.

## INEXPENSIVE VISUAL AID FOR PATIENTS WITH MACULAR DEGENERATIVE CHANGES

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In any ophthalmologist's practice, there are a large number of patients in the older age group. These patients often have macular degenerative changes in the various stages of development that will result in subnormal vision. A great percentage of these changes are vascular in origin and result in macular scarring. These patients have had repeated ophthalmological examinations and have been discouraged with the results they have obtained. They usually have had several pairs of glasses prescribed and have been told that their vision cannot be improved. Many have one or more visual aids which are on the market at the present time. The greatest dissatisfaction of these patients appears to be in their traveling vision; consequently, they are unable to move about freely without assistance.

### IMPROVEMENT OF TRAVELING VISION

Like other ophthalmologists, I have available all the visual aids necessary to determine their value in improving the near and distance vision of these patients. All my early attempts were to improve television and reading vision. One kind soul informed me that she could not read and does not expect any improvement, but if she could get about without assistance, then she would be happy. Since that day, traveling vision has been my first consideration in these patients. The visual acuity for near and distance objects is tested with visual aids after the maximum improvement has been obtained. These patients often present evidence of vitamin deficiencies, which are a result of poor dietary habits or the result of poor absorption of the essential vitamins. They are given prescriptions for therapeutic formula of vitamin "B" complex with vitamin "C". Often, regurgitation will result in a discontinuation of the medication and office intramuscular injections are substituted. A visual and systemic improvement always results and, at times, the improvement is dramatic.

Traveling vision, in these patients with subnormal vision, may often be aided by the use of a special yellow tinted lens. This lens has been described and prescribed as "night driving" or "skeet shooting" lens. They are not well known and very little has been published on the use of these lenses. They are manufactured by the American Optical Company, under the trade name of "Noviol lenses," and by Bausch & Lomb Optical Company, as "Kalichrome lenses." The Bausch & Lomb lens is manufactured in two shades. The "A" shade is lighter in color and transmits some blue light. The "C" shade absorbs all the blue and violet, as well as the ultraviolet rays, and is the one most widely used. Green, yellow, and orange rays are transmitted fairly constantly over the remainder of the visible spectrum. The lens also has a fairly high transmission of the infra red. Historically, the lens is not a new one and has been made in this country for about the same length of times as white crown glass. The Bureau of Standards, in 1918, referred to the yellow ophthalmic lens as the "Akopos

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or Noviol Lens." The lenses are available as moulded blanks, single vision, and in both fused and one-piece bifocal. The "C" shade is made in only a single piece bifocal.

The intended use of the lens is for contrast on murky or foggy days and is not intended for the absorption of glare. In contrast the patient with macular changes is aided on bright sunny days and not on dull days. The patient's prescription may be incorporated in the lens. I had an aphakic pair made for a cataract patient with macular scars. She is now able to tell time and read large letters with these lenses.

A clip-on set of lenses may be used as test lenses. At present, I have several pairs in each refracting room of my clinic. The sizes vary to fit the various sizes and shapes of frames that the patient may be wearing. During the initial ophthalmological examination, I often clip on the yellow lenses, over their frames. The patient is then sent out with an attendant to walk about the clinic. The patient, in his excitement, will tell you if the lenses are of any assistance. Should traveling vision be improved, then he is permitted to take home the clip-on lenses on a trial basis. He is instructed in the use of the lens. Should the patient be satisfied with the results obtained, then his new prescription may be incorporated in the yellow lens.

After several weeks of vitamin and other medication, as needed, the patient returns for further study. The visual improvement and ocular tension are recorded at each visit. If the intraocular pressure permits, I dilate the pupils of my patients with a weak mydriatic. This technique saves time in refracting the patient and gives a better fundus examination. The findings are recorded in detail by my office nurse. The manifest or fogging procedure of refraction is most often futile in the patient with poor visual acuity.

### OTHER VISUAL AIDS

The patient often improves to the stage where various visual aids may be tried. Various magnifiers, telescopic lenses, pin hole glasses, etc., are available in each refracting room. The visual aids often improve vision to the point where the patient can enjoy television and reading. Unfortunately, these patients are beyond the earning period of life and do not have the funds to purchase the more expensive visual aids. The American Foundation of the Blind offers many of these aids to these patients at a reasonable price. The patients' satisfaction with the yellow lenses has been so gratifying that I feel my fellow ophthalmologists should share my good fortune. I also feel that the manufacturers of visual aids should incorporate the yellow lens in their optical systems, as this would raise the percentage of patients assisted by their products. I hope that this paper will stimulate further research in the effect of color filters on patients with subnormal vision.

Note: My thanks to Mr. P. Pyle, of the Ophthalmic Lens Department of Bausch & Lomb Optical Company, for his technical assistance in the preparation of this paper.

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## CLINICAL SIGNIFICANCE OF QUANTITATIVE CHEMICAL ANALYSIS OF HORMONES

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There is little doubt that the central nervous system, particularly phylogenetically ancient centers like the hypothalamus,[1-3] amygdala[4] and hippocampus,[5] profoundly influences secretory activity of the anterior pituitary (adenohypophysis), probably mediated by "hormones" traversing the hypophyseal portal circula-

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tion.[6] It is well known that tropic hormones elaborated by the anterior pituitary regulate in responsive target glands (thyroid, ovary, testis and adrenal cortex) production of hormones that are active metabolically in peripheral tissue cells.

### THYROID STIMULATING HORMONE

*Thyroid stimulating hormone* (TSH) activates the thyroid to produce thyroxine and 3, 5, 3′ triiodothyronine.

### ADRENOCORTICOTROPIN

*Adrenocorticotropin* (corticotropin, ACTH), stimulates adrenal cortical production of glucocorticoids (cortisone, cortisol and corticosterone) and androgens (17-ketosteroids, 17-KS). Glucocorticoids are called Porter-Silber[7] chromogens (PSC) and also 17-hydroxycorticosteroids (17-*OH*-CS). Aldosterone, the principal sodium-retaining hormone of the adrenal cortex, is only partially under control of ACTH.

### PITUITARY GONADOTROPINS

There are three pituitary gonadotropins: (1) During the procreative age in females, *follicle stimulating hormone* (FSH) acts upon the Graafian follicle, resulting in production of estrogens (estriol, estrone, estradiol-17 Beta, 16-*epi*estriol and 16-Alpha-hydroxyestrone). (2) During the procreative age in males *interstitial cell stimulating hormone* (ICSH) causes Leydig cells of the testis to produce androgens, which are measured in urine as 17-KS (1/3 testis and 2/3 adrenal cortex). (3) During the procreative age in females this tropic hormone (ICHS) is called *luteinizing hormone* (LH). It acts upon the corpus luteum to produce progesterone, which is a precursor in the biosynthesis of cortisol (hydrocortisone), pregnanediol and pregnanetriol. Progesterone exerts a powerful influence on pregnancy maintenance (here it is also made in abundance by the placenta) and development and maintenance of acinar breast tissue.

### LUTEOTROPIC HORMONE

*Luteotropic hormone* (LTH, luteotropin, prolactin, lactogenic hormone, galactin, mammatropin) stimulates lactation.

### MODES OF ESTIMATION

Anterior pituitary tropic hormones (TSH, ACTH, FSH, ICSH, LH, LTH) all are measured by biological (animal) assay. Chemical methods for their quantitation have not been perfected. They are of great academic and investigative interest, but with the exception of FSH, rarely if ever, merit clinical determination. Promising assay methods are listed in Table 1.

### CHEMICAL QUANTITATION OF TARGET GLAND HORMONES USEFUL IN CLINICAL PRACTICE

A. THYROID
   1. Serum protein-bound iodine (PBI)[15]
   2. Serum butanol-extractable iodine (BEI)[16]

B. ADRENAL CORTEX
   1. Urinary 17-hydroxycorticosteroids (17-*OH*-CS, PSC)[17]
   2. Plasma 17-hydroxycorticosteroids (17-*OH*-CS, PSC)[18]
   3. Urinary aldosterone (electrocortin)[19]
   4. Urinary 17-ketosteroids (17-KS)[20]

C. ADRENAL MEDULLA
   1. Urinary catecholamines[21]

D. TESTIS
   1. Urinary 17-ketosteroids

E. OVARY
   1. Urinary estrogens[22]
   2. Urinary pregnanediol[23]
   3. Urinary pregnanetriol[23]

TABLE 1
BIOASSAY OF ADENOHYPOPHYSEAL TROPIC HORMONES

| Hormone | Media | Parameter | Reference |
|---|---|---|---|
| TSH | Blood | I-131 discharge from chick thyroid | Gilliland & Fraser[8] |
| ACTH | Blood | Rat adrenal ascorbic acid depletion | Syndor & Sayers[9] |
| FSH | Urine | Rat ovarian weight | Steelman & Pohley[10] |
| ICSH (LH) | Urine | Rat prostatic weight | Greep et al[11]<br>Loraine & Brown[12] |
| LTH | Urine | Pigeon crop histology | Lyons & Page[13]<br>Bahn & Bates[14] |

F. PLACENTA
1. Urinary estrogens
2. Pregnanediol
3. Pregnanetriol

SERUM PROTEIN BOUND IODINE

This inexpensive test of thyroid function,[24-25] while it does not measure specifically any of the thyroid hormones, is well established, having a high index of precision in the absence of exogenous iodide or thyroid. Samples may be drawn at any time without regard to fasting or basal activity. Normal range for children and adults is 4-8 mcg./100 ml. Care must be taken that needles and syringes are not contaminated with iodides. *High* values are found in hyperthyroidism, and *low* values are seen in primary hypothyroidism and secondary hypothyroidism (panhypopituitarism, hypoantuitarism, Sheehan's syndrome, Simmond's disease, hypothalamic and hypophyseal lesions). Spurious deflection in euthyroidism may occur with the following:

A. HIGH
1. Thyroid
2. Estrogen
3. TSH
4. Pregnancy
5. Thyroiditis
6. Thyrotoxicosis factitia
7. Cold exposure
8. Hepatitis
9. Iodides (I. M., I. V., oral, topical, and intrathecal)

B. LOW
1. Thiouracil
2. Testosterone
3. Renal insufficiency
4. Cirrhosis
5. Hg. diuresis
6 Pentothal®
7. Cortisone
8. Irradiation
9. Epinephrine
10. Triiodothyronine

SERUM BUTANOL EXTRACTABLE IODINE

Extraction with butanol[26-28] obviates inclusion in the measurement of inorganic iodide contamination of serum from iodine medications and x-ray procedures such as cholecystograms, myelograms, and pyelograms. It is also of value in the detection of patients whose PBI is normal but who secrete metabolically inactive thyroid hormones. Values in health are about 4/5 that of PBI, except during the neonatal period, where values are higher. Clinical indications are the same as for PBI.

URINARY 17-HYDROXYCORTICOSTEROIDS[28-38]

Collection of samples is an important part of the test. Twenty-four hour volumes are required. The bladder should be emptied and that specimen discarded. Thereafter all urine to include a final voiding twenty-four hours later is collected in a vessel containing a preservative to prevent bacterial digestion. Toluene (5 ml.) or ½ per cent thymol in glacial acetic acid (5 ml.) will suffice for the average twenty-four hour volume. The total volume must be known to the analyst.

Methodology is a topic of considerable importance, and there are sharp differences of opinion on merits of various procedures. It is generally held that glucocorticoids (cortisone, hydrocortisone and corticosterone) are the active adrenal cortical hormones from the standpoint of anti-inflammatory and sugar-promoting effects. These hormones are characterized by 17:20-*diol*, 20-*one* side chain on the steroid molecule and singularly develop yellow color as Porter-Silber chromogens in reaction with phenylhydrazine and sulphuric acid. Refinement of this method with Beta-glucuronidase hydrolysis (in lieu of hot acid) and aluminum trisilicate (florisil®) column chromatography has resulted in a method (Glenn-Nelson) of high specificity. Methods employing reduction or oxidation measure additional steroids, many of which have no glucocorticoid activity.

Physiological variations in 17 - OH - CS are: (1) Diurnal rhythmicity, with low values at midnight; (2) rise with stress and late in pregnancy, and (3) fall in the neonatal period (third to tenth day of life).

Glenn-Nelson values in health are: males 3-8 mg/24 hours and females 2-6 mg/24

hours. Elevated values with ACTH stimulation (20 USP units in 1000 ml. 5 per cent dextrose in D/W infused I.V. from 8 A.M. to 4 P.M.) are 4 to 8 times higher in normals. Suppression of endogenous ACTH and subsequent fall in adrenal cortical function with 9-Alpha - fluorohydrocortisone (1 mg. every eight hours for three days) or triamcinolone (aristocort®) 2 to 4 mg. every 6 to 8 hours for three days results in low values (0.5 to 2 mg/24 hours) in normals.

*Clinical indications* for urinary 17-*OH*-CS are: Cushing's disease (pituitary basophilic adenoma), Cushing's syndrome (bilateral adrenal cortical hyperplasia, adrenal cortical adenoma, and adrenal cortical carcinoma), Addison's disease, panhypopituitarism, adrenogenital syndrome, and when *obesity* is coupled with other stigmata of adrenal cortical hyperfunction, such as hirsutism, striae, psychosis, diabetes mellitus, acne, hypertension, peptic ulcer, osteoporosis, nephrocalcinosis and renal stones.

*High* values are encountered in Cushing's disease, Cushing's syndrome, hyperthroydism, often in acromegaly, sometimes in Laurence-Moon-Biedl and Klinefelter's syndromes, and following ACTH administration or exogenous Compound E (cortisone acetate), Delta-1-E (prednisone), Compound F (hydrocortisone), Delta-1-F (prednisolone) and 6-methyl-prednisolone in dosage above 30 mg. per day.

*Low* values are observed in Addison's disease, panhypopituitarism, and following administration of small doses of 9-Alpha-fluorohydrocortisone (2-6 mg. daily) or triamcinolone, since the C-16-*OH* grouping of triamcinolone (aristocort®) apparently prevents appreciable recovery [39] of the compound as Porter-Silber chromogens.

PLASMA 17-HYDROXYCORTICOSTEROIDS

There is linear relationship between urinary and plasma 17-*OH*-CS. Clinical indications are the same as for urinary 17-*OH*-CS, but measurement from the circulation should be preferred to urinary measurement, since patients sometimes are unforthcoming with total 24 hour volumes. Normal values are 6-22 mcg./100 ml., and following 25 USP units of ACTH given I.V. for four hours, values rise to 35-55 mcg./100 ml.[40-41] High and low values have the same significance as urinary 17-*OH*-CS.

URINARY ALDOSTERONE

Aldosterone quantitation is a laborious procedure requiring continuous chloroform extraction, serial chromatography on silica, celite and paper, and final estimation by fluorimetry. Normal range is 4.6 to 18.9 mcg./24 hours. Low values are found in Addison's disease [42] and post-adrenalectomy (bilateral) syndrome. High readings are seen in primary aldosteronism [43] (adrenal cortical tumor or bilateral hyperplasia), nephrotic syndrome, cardiac failure with edema,[44] malignant hypertension,[45] cirrhosis of the liver with ascites,[46] and in late pregnancy.[47] Diurnal variation is absent.[48] Hydration and electrolytes markedly influence urinary aldosterone excretion.[49]

Technical time required and reagent expense rarely justify aldosterone measurement in clinical medicine. Indirect calculation in all cases should precede requesting aldosterone quantitation. When serum sodium and potassium are expressed in mEq/L, a ratio $\frac{Na+}{K+}$ less than 30 usually precludes primary aldosteronism.

URINARY 17-KETOSTEROIDS

Collection procedure is identical with urinary 17-*OH*-CS. Urinary 17-KS are derived from 5 Alpha-androstane and 5 Beta-androstane. They are characterized by an oxygen atom at C-17. Desoxy, oxo and hydroxyl groupings at C-11, and spatial differences of hydroxyl groupings at C-3 and hydrogen atoms at C-5 differentiate the various compounds. They are elaborated principally by the adrenal cortex (2/3) and testis (1/3), with small quantities from the ovary. They are conjugated by the liver and excreted in urine as glucuronides and sulphates. Quantitation is based on acid hydrolysis, purification and development of the purple Zimmerman color with *m*-dinitrobenzene.

Physiological variants are low levels in children (0 to 1 mg) up to 6 years of age, with gradual increases to a sharp

rise at puberty and a final gradual decline from age 30 to senescence.[50] Normal values for adult males are: 10 to 20 mg./24 hours, and for females: 5 to 15 mg./24 hours.

*High* values are seen in Cushing's syndrome, congenital adrenal cortical hyperplasia (adrenogenital syndrome), testicular tumors (interstitial cell, seminoma, teratoma), stress, following morphine withdrawal, and some cases of virilization, hirsutism, sexual precocity, ovarian tumors (arrhenoblastoma), acne and Stein-Leventhal Syndrome.

*Low* values are found in Addison's disease, male hypogonadism, panhypopituitarism, myxedema, anorexia nervosa, hepatic insufficiency, glucocorticoid medication, post-adrenalectomy (bilateral) syndrome, post-hypophysectomy, post-orchidectomy, some cases of gynecomastia and often in schizophrenia.

#### URINARY CATECHOLAMINES

Voided specimens of 200 ml. following hypertensive paroxysms are satisfactory, however, the test is performed better on twenty-four hour urine volumes collected in 10 ml. 6N sulfuric acid. The *p*H should be kept below 4.0 with 6N sulphuric acid to prevent deterioration of catechols (epinephrine and norepinephrine). The method depends upon fluorescence properties of catechols.

Values less than 15 mcg./100 ml. of urine or less than 100 mcg./24 hours are found in normals. In pheochromocytoma and certain psychiatric disorders larger quantities are excreted.

It is estimated that 800 persons in the United States die annually because of pheochromocytoma.[51] Since hypertension from these adrenal medullary tumors is curable with surgery, there are many who believe screening hypertensives by urinary catecholamine determination will approach routine in the near future.

#### URINARY ESTROGENS

Twenty-four hour urine collections as described for 17-*OH*-CS are required. Structurally estrogens are steroids closely resembling 17-ketosteroids, with characterization chiefly by the phenolic ring A, giving weakly acidic properties. Five compounds (estriol, estrone, estradiol-17 Beta, 16-*epi*estriol and 16-Alpha-hydroxyestrone) have been isolated from urine in humans.

In health chief sources of estrogens are the ovary and placenta. Small amounts are found in the adrenal cortex and testis.

Biological and fluorometric estimation of estrogens lack sufficient index of precision for clinical use. The colorimetric method of Brown has quantitative specificity for estriol, estrone and estradiol-17 Beta as low as 2 mcg./24 hours. Unfortunately it does not measure 16-*epi*estriol or 16-Alpha-hydroxyestrone, but it is the only method which gives reproducibility, and therefore, should be used for quantitative estimation. Colorimetric determination of estrogens is a toilsome, not inexpensive procedure, and judiciousness seems essential in its clinical use. Vaginal cytological counts should be used for qualitative estrogen estimation.

Physiological variations are low levels in children[52] and men,[53] relatively low levels in the first ten days of the menstrual cycle, with an ovulation peak congruous with temperature rise, and gradual fall until catamenia ensues.[54] There are low levels postmenopausally,[55] and great increases in late pregnancy.[56]

TABLE 2
PHYSIOLOGICAL RANGE OF URINARY ESTROGENS (MCG./24 hours)

| Sex | State | Estriol | Estrone | Estradiol-17B |
|---|---|---|---|---|
| | Onset menses | 0-15 | 4-7 | 0-3 |
| | Ovulation | 13-54 | 11-31 | 4-14 |
| Women | Luteal Peak | 8-72 | 10-23 | 4-10 |
| | Postmenopausal | 0.6-8.6 | 0.8-7.1 | 0-3.9 |
| | 3rd Trimester | 30,000 | 2,000 | 750 |
| Men | | 0.8-11 | 3-8.2 | 0-6.3 |

PATHOLOGICAL EXCRETION OF URINARY ESTROGENS

A. HIGH
1. Ovarian tumors (granulosa cell, thecoma, fibroma, Brenner)
2. Chorionepithelioma of ovary and testis
3. Cushing's syndrome with feminization
4. Some cases of gynecomastia

B. LOW
1. Primary and secondary amenorrhea
2. Threatened abortion
3. Fetal death
4. Pre-eclamptic toxemia
5. Lactation
6. Puerperium
7. Post-adrenalectomy (bilateral)
8. Post-hypophysectomy
9. Ovarian dysgenesis (Turner's syndrome)

URINARY PREGNANEDIOL AND PREGNANETRIOL

Collection of samples is similar to that for 17-*OH*-CS. Pregnanediol and pregnanetriol are metabolites of progesterone. Quantitation is accomplished with Beta-glucuronidase incubation, benzene extraction, alumina column chromatography, and elution with ethanol.

Physiological variations of pregnanetriol are less than 1.6 mg./24 hours in children, men and women,[57] with elevations of 2-7 mg./24 hours in the third trimester of pregnancy[58] and in hyperthyroidism.[59] Pregnanediol variations are less than 1.6 mg./24 hours in children,[60] men[61] and during the follicular phase in menstruating women. The luteal peak in women causes rises of 5-10 mg./24 hours.[62] In the last seven months of pregnancy values gradually increase to 60-100 mg./24 hours.[63]

In patients with congenital adrenal cortical hyperplasia (adrenogenital syndrome) there is genetic error in enzymatic biosynthesis of cortisol from 17-Alpha-progesterone, which results in increased quantities of pregnanediol and pregnanetriol in urine as optional metabolites.

PATHOLOGICAL URINARY EXCRETION OF PREGNANEDIOL AND PREGNANETRIOL

A. HIGH
1. Stein-Leventhal syndrome
2. After ACTH
3. Progesterone medication
4. Congenital adrenal cortical hyperplasia
5. Some other types of Cushing's syndrome

B. LOW
1. Amenorrhea (primary and secondary)

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# The Journal of the Louisiana State Medical Society

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## DR. JAMES Q. GRAVES

With the passing of Dr. James Q. Graves the community of Monroe and the Louisiana State Medical Society, and the cause of organized medicine lost an eminent physician, a good friend, and a devoted servant.

Dr. Graves died unexpectedly at the age of eighty on November 10, 1958. He was practicing medicine up to the hour of his death. He was still exhibiting the enthusiastic zeal and active leadership for which he was so widely known.

Dr. Graves was born in Columbia, Louisiana, in 1878. He was graduated from Louisiana Tech., and later finished Tulane University School of Medicine in 1906. He interned in Charity Hospital, Shreveport, practiced two years in Columbia, Louisiana, and moved to Monroe, where he became a beloved physician, revered for his skill and judgment and renowned for his cheerfulness and resourcefulness.

He was the only surviving member of the original staff of the St. Francis Hospital.

He was active in the affairs of Ouachita Parish Medical Society, and in the Louisiana State Medical Society, in which he served on Councils and Committees. For thirty years, he was one of the two delegates from Louisiana to the House of Delegates of the American Medical Association, and had the distinction of having served longer than any other delegate. He had the further distinction of being known throughout the nation for his genial friendship, constructive leadership, and sound advice.

In 1956, he received a citation along with ten other physicians in the Fifty Year Doctor club awarded by the Louisiana State Medical Society. Similarly, he was recognized as a fifty year graduate of the Tulane University Medical School.

He was an active member and past president of the Louisiana Surgical Association, and was a Fellow of the American College of Surgeons. He was a past president of the Monroe Rotary Club, a member of the First Methodist Church in Monroe, and an active Mason.

Dr. Graves radiated cheerfulness and set an example of integrity and adherence to ethical principles, which was to be admired by all. For more than fifty years he practiced a profession that he loved and exhibited his great interest in medical progress. His appreciation of the benefits of the profession properly practiced contributed to his enthusiasm and energy. He was one of those physicians most effective in making Monroe a medical center.

It is most appropriate that a Department of Radioactive Isotopes for the treat-

ment and diagnosis of disease will be established at the St. Francis Hospital in memory of Dr. Graves. Such a department will be a most fitting memorial to a physician whose aim it was to exemplify the higher precepts of medicine.

He is survived by his widow and four daughters, and by ten grandchildren, all of Monroe. The members of the profession will miss his friendship and good counsel, and his community will miss his skill, enthusiasm, and kindly advice.

## ORGANIZATION SECTION

**The Executive Committee dedicates this section to the members of the Louisiana State Medical Society, feeling that a proper discussion of salient issues will contribute to the understanding and fortification of our Society.**

***An informed profession should be a wise one.***

### SIMPLIFIED INSURANCE CLAIM FORMS

A guide for physicians on the use of the new simplified forms for accident and health insurance policies issued by insurance companies has been published by the Health Insurance Council.

Entitled "Simplified Claim Forms for Accident and Health Insurance—A Report to the Physician," the manual describes the principles of the Council program to reduce paper work for doctors and at the same time provide insurance companies with the medical information they need to process and pay claims. The claim forms—called "Standardized Attending Physician's Statements"—were developed by the Council's Uniform Forms Committee in cooperation with the American Medical Association.

Ralph T. Heller, Chairman of the Uniform Forms Committee and Second Vice President of the Prudential Insurance Company of America, described the report as a supplement to a booklet distributed among insurance companies last year urging their adoption of the new forms.

"The response of the insurance business to the report to companies has been most gratifying," declared Mr. Heller. "A steadily growing number of insurance companies across the country have adopted the simplified claim forms and others have made definite plans to do so. Now we want to tell our story to the nation's doctors, so that they may be better aware of what is being done to reduce the burden of their paper work, and, thereby, better serve their insured patients."

Mr. Heller stressed the need for cooperation by all physicians in their acceptance and use of the simplified claim forms, noting that these forms have been approved by the American Medical Association's Council on Medical Service upon the recommendation of its Committee on Prepayment Medical and Hospital Service. In addition, he emphasized that the Uniform Forms Committee is "continuing to study ways and means to further implement the program."

"Whenever modification of the present forms becomes desirable as a result of expanding health insurance coverage," added the Council spokesman, "such changes will be made in a manner compatible with the needs of the public, the medical profession and the insurance companies."

Replacing a great variety of claim forms from hundreds of companies, the Health Insurance Council forms consist of two basic attending physician's statements—one for group accident and health insurance, and the other for individual and family health policies. They are to be used solely in connection with accident and health insurance claims.

The forms comprise a standard set of questions, in a standard sequence, which are the minimum required to meet the provisions of most insurance companies. Some questions and phrases are optional and in many instances will not be required or used by companies. The questions used, however, will be sufficient to provide the information needed to process routine claims of all types, including initial and continuing proof of disability as well as surgical and medical claims information.

In addition, there are four abbreviated forms to be used for surgical and continuing disability statements for group and individual insurance respectively.

A key feature of the simplified claim forms program is the new identifying symbol developed by the Council for use on the claim forms. Certifying that the standard wording and sequence of questions have been utilized, the symbol facilitates doctor recognition of the form. In this regard, Mr. Heller noted that it will take "some time for companies to imprint the new symbol on the simplified forms which are already in widespread use."

Additional copies of "Simplified Claim Forms for Accident and Health Insurance—a Report to the Physician" may be obtained upon request from the Health Insurance Council, 488 Madison Avenue, New York 22, New York.

This pamphlet has been mailed to each member

of our Society, and it is hoped that these insurance forms will meet with your approval. These forms have been approved by your State Society and American Medical Association.

### DEATHS 1958
### MEMBERS OF LOUISIANA STATE MEDICAL SOCIETY

Dr. Kotz Allen, New Orleans, November 4
Dr. Jacob Barnett, New Orleans, August 23
Dr. William Louis Bendel, Monroe, February
Dr. J. N. Brown, Campti, October 10
Dr. Daniel Clyde Brumfield, Darrow, March 23
Dr. Gene Delmar Caldwell, Shreveport, March 11
Dr. Francis Urban Darby, Box 435, Loreauville, September 20
Dr. George Frederick C. Fasting, New Orleans, May 26
Dr. William Robert Garrett, Springhill, March 19
Dr. Irving Jeffery Glassberg, Minneapolis, July 28
Dr. Samuel Joseph Goldfain, Baton Rouge, January 17
Dr. J. Q. Graves, Monroe, November 12
Dr. Cheney Cleveland Joseph, Baton Rouge, October 13
Dr. William Ernest Kramer, Monroe, October 17
Dr. James Vann Lamberth, Pineville, March 23
Dr. Frank Eugene Lamothe, New Orleans, March 19
Dr. Wallace James Landry, Jr., New Orleans, November 15
Dr. George Charles Miramon, New Orleans, January 2
Dr. Charles Francis O'Brien, Jackson, La. January 20
Dr. Ruffin Baker Paine, Mandeville, May 25
Dr. Cassius Lee Peacock, New Orleans, March 16
Dr. Paul W. Renken, New Orleans, November 22
Dr. Wallace Saburo Sako, Raceland, July 5
Dr. George Mason Graham Stafford, Baton Rouge, February
Dr. James Alex Thom, Baton Rouge
Dr. David Weinstein, Opelousas, June 29
Dr. G. Richarda Williamson, New Orleans, September 19
Dr. Edward Bradley Young, Zachary, March 11

# MEDICAL NEWS SECTION

## CALENDAR

### PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

| Society | Date | Place |
|---|---|---|
| Ascension | Third Tuesday of every month | |
| Calcasieu | Fourth Tuesday every other month | Lake Charles |
| East Baton Rouge | Second Tuesday of every month | Baton Rouge |
| Morehouse | Third Tuesday of every month | Bastrop |
| Natchitoches | Second Tuesday of every month | |
| Orleans | Second Monday of every month | New Orleans |
| Ouachita | First Thursday of every month | Monroe |
| Rapides | First Monday of every month | Alexandria |
| Sabine | First Wednesday of every month | |
| Tangipahoa | Second and fourth Thursdays of every month | Indepencence |
| Second District | Third Thursday of every month | |
| Shreveport | First Tuesday of every month | Shreveport |
| Vernon | First Thursday of every month | |

### SEVENTH POSTGRADUATE CONFERENCE IN MEDICINE AND SURGERY

The Temple Division of the University of Texas Postgraduate School of Medicine announces its SEVENTH POSTGRADUATE CONFERENCE stressing **Current Topics in Medicine and Surgery.** Dr. F. J. L. Blasingame, Executive Vice-President of the American Medical Association, will be the guest speaker. **Open House** in the Department of Clinical Investigation and Research and in the Department of Physiotherapy and Rehabilitation is scheduled for the third afternoon. This program, sponsored by Scott, Sherwood and Brindley Foundation, will be presented in Temple on March 2, 3, 4, 1959.

Registration forms are available from the office of the Assistant Dean, University of Texas Postgraduate School of Medicine, Temple Division, Temple, Texas.

### SOUTHEASTERN REGIONAL MEETING INTERNATIONAL COLLEGE OF SURGEONS

The Southeastern Regional Meeting of the International College of Surgeons will be held at the Americana Hotel, Bal Harbou, Miami Beach, Florida, from January 4th to 7th, 1959.

This meeting has been approved for general practitioners also, by the American Academy of General Practice for Category I credit.

Those interested may write for a preliminary

program to: Harold O. Hallstrand, M. D., General Chairman, 7210 Red Road, South Miami, Fla.

## AMERICAN COLLEGE OF CHEST PHYSICIANS

At the 15th Annual Meeting of the Southern Chapter of the American College of Chest Physicians, held in New Orleans, November 2-3, 1958, the following officers were elected:

President: Daniel E. Jenkins, Houston Texas
1st Vice-President: John H. Seabury, New Orleans, Louisiana
2nd Vice-President: DeWitt C. Daughtry, Miami, Florida
Secretary-Treasurer: Henry R. Hoskins, San Antonio, Texas

The following have been elected officers of the Louisiana Chapter of the American College of Chest Physicians:

President: Morton M. Ziskind, New Orleans
1st Vice-President: Howard A Buechner, New Orleans
2nd Vice-President: Dwight S. Danburg, Greenwell Springs
Secretary-Treasurer: William Leon, New Orleans

## POSTGRADUATE COURSE ON DISEASES OF THE CHEST

The Council on Postgraduate Medical Education of the American College of Chest Physicians will present the Fourth Annual Postgraduate Course on Diseases of the Chest at the Sir Francis Drake Hotel, San Francisco, California, February 16-20, 1959.

The most recent advances in the diagnosis and treatment of heart and lung diseases, medical and surgical aspects, will be presented.

Tuition for this five-day course will be $100, including luncheon meetings.

Further information may be obtained by writing to the Executive Director, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

## GASTROENTEROLOGISTS ELECT

Dr. Joseph Shaiken, Milwaukee, Wisc., Associate Professor of Clinical Medicine, Marquette University Medical School, has been chosen as President-Elect of the American College of Gastroenterology, at the Annual Meeting of the College, held Sunday, October 19th, in New Orleans, La. He will assume the Presidency at the Annual Meeting to be held in Los Angeles, Calif., in September of 1959.

Dr. Frank J. Borrelli of New York, N. Y., selected President-Elect in Boston in 1957, assumed the Presidency of the College at the Annual Dinner-Dance held at the Jung Hotel on October 21. He succeeds Dr. C. Wilmer Wirts of Philadelphia, Pa.

Other officers elected were: Vice-Presidents—Drs. Henry Baker, Boston, Mass.; Louis Ochs, Jr., New Orleans, La.; Edward J. Krol, Chicago, Ill.; Dr. Theodore S. Heineken, Glen Ridge, N. J. Dr. Joseph R. Van Dyne, Forest Hills, N. Y., was elected Secretary.

## THE NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

The twenty-second annual meeting of The New Orleans Graduate Medical Assembly will be held March 2-5, 1959, headquarters at the Roosevelt Hotel. Listed below are members of the Standing Committees for this year:

ADVERTISING AND PUBLICITY
Donovan C. Browne, M.D., Chairman
Edmond L. Faust, M.D., Vice-chairman

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## AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The next scheduled examinations (Part II), oral and clinical for all candidates will be conducted at the Edgewater Beach Hotel, Chicago,

Illinois, by the entire Board from May 8 through 19, 1959. Formal notice of the exact time of each candidate's examination will be sent him in advance of the examination dates.

Candidates who participated in the Part I examinations will be notified of their eligibility for the Part II examinations as soon as possible.

Current Bulletins of the American Board of Obstetrics and Gynecology, outlining the requirements for application, may be obtained by writing to Robert L. Faulkner, M. D., Secretary, 2105 Adelbert Road, Cleveland 6, Ohio.

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## WOMAN'S AUXILIARY TO THE LOUISIANA STATE MEDICAL SOCIETY

### ORLEANS PARISH

The Woman's Auxiliary to the Southern Medical Association, in New Orleans for their thirty-fourth annual meeting, were entertained at a tea the afternoon of Wednesday, November 5, at the Orleans Club with the members of the Woman's Auxiliary to the Orleans Parish Medical Society acting as hostesses.

Honored guests were Mrs. Walker L. Curtis, president of S.M.A. Auxiliary, Mrs. George W. Owen, president-elect and Mrs. E. Arthur Underwood, president Woman's Auxiliary to the American Medical Association.

Receiving with the honorees were Mmes. Albert Habeeb, F. J. L. Blasingame, George F. Lull, Edwin L. Zander, Milford O. Rousa, Charles B. Odom, Arthur D. Long and Edward Harrell. Mrs. J. Morgan Lyons was chairman of the tea and was assisted by Mmes. J. Kelly Stone, William J. Rein, Boni J. deLaureal, C. Grenes Cole, D. W. Hayes.

Assisting in the dining room during the hours of the tea were Mmes. George D. Feldner, Wiley R. Buffington, Rufus Alldredge, Hyder Brewster, Richard Buck, A. B. Cairns, Claude G. Craighead, Carl E. Granberry, Max M. Green, M. M. Hattaway, Edgar Hull, Howard Mahorner, B. F. Parker, Joseph Reddoch, John T. Sanders and Robert Sharp.

### OUACHITA PARISH

The Bayou DeSiard Country Club was the setting for a luncheon and style show when the Woman's Auxiliary to the Ouachita Parish Medical Society held its October meeting. Hostess for the luncheon was Mrs. Doyle Hamilton and she was assisted by Mrs. Henry Hammonds as co-chairman, and Mmes. C. E. Wilds, J. B. Jones, George Wright, Jr. and Fred Millsaps. The models showing the latest fashions were Mmes. E. T. Chapman, Vernon Maish, William Durrett, John Crump, James Ewing, III, John B. McKinley, Fred Petty, Hugo Angelini, Doyle Hamilton, J. B. Stoddard, Herbert Mayo and Robert Wood.

Mrs. Branch J. Aymond,
Press and Publicity chairman.

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# BOOK REVIEWS

*William Harvey, His Life and Times, His Discoveries, His Methods*, by Louis Chauvois. New York, Philosophical Library, 1957. pp. 271 pl. Price, $7.50.

It is a characteristic of the truly great that their fame and recognition increase rather than diminish with the passing years, and so it is with William Harvey. His work is of paramount importance, not only because it served as a foundation of modern physiology, but also because he established a pattern for the conduct of research by experiment, through observation, consideration, experiment and judgment of results.

The author is a distinguished French physician, medical historian, and Latinist, recipient of the *Prix d'Histoire et de Philosophie des Sciences* of the *Academie des Sciences de Paris*, in 1955. In this volume, Dr. Chauvois gives not only an original and scholarly life of William Harvey and his relations with his contemporaries, but re-examines the Latin texts of Harvey's teachings and shows that certain current interpretations of Harvey's teachings are incorrect. He considers Harvey's line of thought in the light of modern knowledge and suggests from his study, some modifications of practical importance in the interpretation of the circulation of the blood.

MARY LOUISE MARSHALL

### PUBLICATIONS RECEIVED

Doubleday & Co., Inc. N. Y.: The Doctor Business, by Richard Carter.

Paul B. Hoeber, Inc., N. Y.: Clinical Obstetrics and Gynecology: Symposium on Special Diagnostic Aids, edited by C. Paul Hodgkinson, M.D.; Symposium on Abnormal Uterine Bleeding, edited by John I. Brewer, M.D.

The C. V. Mosby Co., St. Louis: Breast Cancer; The Second Biennial Louisiana Cancer Conference, edited by Albert Segaloff, M.D.

Philosophical Library, N. Y.: Epilepsy, by Manfred Sakel, M.D.

Charles C Thomas, Publisher, Springfield, Ill.: The Recovery Room; A Symposium, by John Adriani, M.D., and John B. Parmley, M.D.

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